

THE ECONOMICS OF AGRICULTURE

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INTRODUCTION TO THE SERIES

By the General Editor

SHORTLY after the war of 1914-18 there seemed to be a place for a series of introductory Economic Handbooks "intended to convey to the ordinary reader and to the uninitiated student some conception of the general principles of thought which economists now apply to economic problems".

This series was planned by the late Lord Keynes under the title *Cambridge Economic Handbooks*, and he wrote for it a general editorial Introduction of which the words quoted above formed part. In 1936 Lord Keynes handed over the editorship of the Series to Mr. D. H. Robertson, who held it until he became Professor of Economics in the University of London.¹

The judgment of its originators has been justified by the wide welcome given to the Series. Apart from its circulation in the British Empire, it has been published from the start in the United States of America while translations of the principal volumes have so far appeared in German, Spanish, Italian, Swedish, Japanese, Polish and Lithuanian.

It is symptomatic of the changes which have been taking place in recent times in the development of economic science, changes associated in a high degree with the work and influence of Lord Keynes himself, that within the brief space of fifteen years the text of

¹ Professor Robertson now holds the Chair of Political Economy in the University of Cambridge.

part of the Editorial Introduction should have stood in need of revision. In its original version the last paragraph of the Introduction to the Series ran as follows :

“ Even on matters of principle there is not yet a complete unanimity of opinion amongst professors. Generally speaking, the writers of these volumes believe themselves to be orthodox members of the Cambridge School of Economics. At any rate, most of their ideas about the subject, and even their prejudices, are traceable to the contact they have enjoyed with the writings and lectures of the two economists who have chiefly influenced Cambridge thought for the past fifty years, Dr. Marshall and Professor Pigou.”

When the Editorship of the Series was transferred to Mr. D. H. Robertson, Lord Keynes consented to the retention of his general Introduction, but subsequently re-wrote the concluding paragraph in the following form :—

“ Even on matters of principle there is not yet a complete unanimity of opinion amongst professional students of the subject. Immediately after the war daily economic events were of such a startling character as to divert attention from theoretical complexities. But to-day, economic science has recovered its wind. Traditional treatments and traditional solutions are being questioned, improved and revised. In the end this activity of research should clear up controversy. But for the moment controversy and doubt are increased. The writers of this series must apologize to the general reader

and to the beginner if many parts of their subject have not yet reached to a degree of certainty and lucidity which would make them easy and straightforward reading."

Still more recent events have produced a world so far removed from that which existed when the foregoing words were written, that it has fallen to the lot of the present Editor to provide a new introduction.

This is perhaps a good vantage point from which to survey very briefly some of the principal trends in the evolution of economic thought in this country during the past thirty years. Prior to 1914 economic theory here was largely dominated by Alfred Marshall; and economists, following him, thought in terms of the long period tendencies of the different sections of the economic system towards positions of equilibrium, even though ever-present dynamic factors were perpetually modifying the existing structure and presenting new and equally distant, if equally unattainable, goals as stimuli to change and adaptation. Moreover, in the Marshallian system, those tendencies resulted from the working of persistent underlying forces which were conceived of as largely competitive in character. The increasing trend towards monopoly was certainly affecting thought, but not so much in the realm of the theory of value, as in the emphasis which came to be laid on possible discrepancies between the private interest and the social interest. Under the influence of Professor Pigou a Welfare Economics was developing side by side with, and out of, the Value Economics of the older generation.

After 1918 the long-drawn-out agony of the depressed areas, the weakening of the position of this country in

international trade, and the tremendous intensity of the economic crisis of 1930-32 (to mention but a few out of the many contributing causes) combined, on the one hand, to focus attention on problems of the short period and, on the other hand, to throw doubt on the extent to which the self-adjusting, seemingly automatic mechanism, which on the whole had operated so effectively during the nineteenth century, was capable of coping with the deep-seated maladjustments and disharmonies which characterized the post-war world. At the same time value theory itself was profoundly influenced by the emergence of a number of writers who approached value problems from the view-point of monopoly, and emphasized the unrealistic nature of an analysis which was based on the assumptions of perfect competition and a perfect market. Most of all, however, economic thought was dominated by the desire to find a solution for the problem of how to maintain the level of effective demand so as to avoid the recurrence of phases of deep depression and widespread unemployment. There was a growing feeling of impatience with the economics of the long period "in which we are all dead," and a great, perhaps even excessive, concentration on the short period in which we live and move and have our being.

The result was a remarkable ferment of ideas, the challenging of ancient orthodoxies, and "for the moment controversy and doubt [were] increased". This ferment had by no means subsided when the second war with Germany broke out in September 1939, bringing in its train a degree of state interference with the normal peace-time working of the economic

system far exceeding that reached even in the last years of the war of 1914-18.

In so far as it is possible to foresee future trends, they would seem to lie in a much greater measure of conscious public control over many aspects of economic activity than has existed in the past. It will no doubt still remain true, to quote Lord Keynes's Introduction again, that :

“ The Theory of Economics does not furnish a body of settled conclusions immediately applicable to policy. It is a method rather than a doctrine, an apparatus of the mind, a technique of thinking, which helps its possessor to draw correct conclusions.”

Nevertheless, economists may well find themselves to a greater degree than hitherto called upon to express their views on matters of economic policy, and—for a time at least—the writers of future volumes of the Cambridge Economic Handbooks may be concerned rather with specific problems than with the more general aspects of economic theory.

C. W. G.

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ECONOMICS OF AGRICULTURE

CHAPTER I

INTRODUCTORY

§ 1. *Differences between Agriculture and Industry.* Marshall defined economics as "a study of mankind in the ordinary business of life." Agriculture is the oldest business in the world and, even to-day, the largest. The majority of the population of the world, probably nearly two-thirds of the total, are dependent upon it for a living.

The general framework of economic theory is applicable to the business of agriculture just as much as to that of industry. The analysis of the equilibrium of demand and supply, of value and price, and of distribution, is as valid in agriculture as in industry. In so far as economic theory is concerned with special industries, it has developed a technique which is suitable for all businesses where both producers and consumers weigh against each other the relative advantages to them of different courses of action. This general theory, however, is very general, and gives no more than an outline of mankind's economic behaviour. When it attempts to become more precise it must base its theories on various assumptions as to the special conditions under which different

divisions of economic life are carried on. If the purpose of economic study is more than intellectual exercise, if it seeks to explain economic life as it is, and perhaps to provide a basis for improvement, then its success must depend upon the validity of the assumptions upon which it is based.

It is at this stage that the economics of agriculture and the economics of industry diverge to some extent. There are substantial differences in the natural conditions under which production must be carried on, and in the sociological background, which lead to important differences on the supply side.

Firstly, many agricultural commodities are joint products, either, like wheat and offals, or mutton and wool, because they are both part of the same plant or the same animal, or, like barley and sheep, because they are frequently produced most cheaply on the same farm. The costs attributable to the various products cannot be separated, as they often can in industry, even when several products are produced in the same factory. Thus it is rarely justifiable to consider the supply of any product in isolation.

Secondly, agriculture, on the whole, requires a far larger proportion of land in relation to its employment of other factors than does industry. This is the underlying cause of many of the chief differences between agriculture and industry, such as the tendency to diminishing returns, the wide scatter of production, and the great importance of systems of land tenure.

Thirdly, farming is, as a general rule, undertaken in small-sized units and gives comparatively little scope for the division of labour; thus that part of economic analysis which has been developed to explain the large-

scale organization typical of industry is less applicable to agriculture. On the other hand, the large portion of economic theory which assumes perfect competition is far more real in agriculture than in industry. The farmer almost always disregards the effect of any change in his own output upon price, which is rarely true of the industrialist.

Fourthly, because of the effect of the weather and of biological factors, yields of farm products vary considerably; thus the farmer cannot fully control the amount he produces.

Fifthly, partly because of its small-scale organization, the production of agricultural products frequently responds rather differently to price changes than does that of most industrial products, so that supply may adjust itself only slowly to price changes.

Finally, agriculture is often regarded as a way of life as well as a means of livelihood, so that sociological, political, and sentimental considerations influence its organization more than that of other forms of activity.

The differences on the demand side are less clear-cut, but no less important. First, and chiefly, agriculture is mainly concerned with the production of food, which is the basic necessity of life. It is therefore to be expected that, as generally improving technique makes possible a higher standard of life, the demand for agricultural products will increase less rapidly than that for industrial. Thus the study of agriculture is the study of an industry growing less rapidly than other branches of activity and indeed with numbers employed in it often falling.

Secondly, agricultural products are generally perishable, so that it is less easy to postpone their

consumption. Partly as a result of this, and partly because of the small scale of production, the middlemen between the original producers and the final consumers assume a place of particular importance for agricultural products.

Largely because of these differences between agriculture and industry, most Governments even before the war intervened to assist agriculture. There were few farmers in the world at the outbreak of war whose decisions were not affected as much by Governmental interference in the pricing process as by the results of the unfettered action of producers and consumers. The war, of course, has greatly increased the scope of this intervention.

§ 2. *The Scope of this Volume.* This book does not attempt to analyse in full the economics of agriculture, since such an analysis would include the greater part of economic theory; it assumes some knowledge of economic principles, particularly such as can be obtained from the earlier volumes of this series. It is concerned to a large extent to point out the differences between the economics of agriculture and those of industry. It does not cover the whole field; in particular, rather little attention is paid to those problems of farm management which are usually included within the field of agricultural economics, although similar problems in industry are more often taken to be within the realm of business efficiency studies rather than within that of economics proper.

The study is divided into three sections. The first, comprising Chapters II-V, is concerned with the statics of agricultural economics, with the interrelationships

between its various products, with diminishing returns, the location of agriculture, the size of farms, and with demand and the organization of marketing. The second, containing Chapters VI–VIII, deals with dynamics, with the adjustment of agriculture to changing conditions ; the reaction of supply and demand to price changes is analysed first, and then the nature of the trends in prosperity and prices and of the fluctuations about these trends. Both these sections deal with agriculture under conditions of free competition ; the final section, Chapter IX, indicates how the State can usefully interfere in agriculture, and gives a brief evaluation of the reasons for and the economic consequences of some of the most common forms of State intervention.

§ 3. *The Peculiar Position of British Agriculture.* The study is intended to give some idea of the economic problems associated with agriculture in all of the main types of farming in the world. It must, however, be based upon assumptions as to the social and material organization of society. Where these differ substantially from country to country not all types of organization can be taken into account, and this book is written with special regard to conditions in England, though reference is also made to conditions in certain other countries.

It is perhaps worth while pointing out here the most outstanding peculiarities of English agriculture, to which we shall return in greater detail at many points in the chapters that follow. England is primarily an industrial country, whose standard of living is high ; and this profoundly affects its agriculture. Firstly,

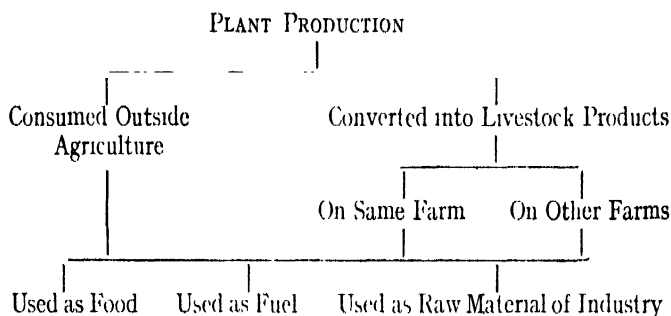
its farmers have a large market with relatively high purchasing power close at hand, which encourages intensive farming of the more perishable and less easily transported products, while a large part of the remainder of the industrialists' food requirements are obtained in the form of imports. Secondly, the farm must compete with industry for its labour supply, as labour can earn good wages in industry ; this induces a more highly capitalized and mechanized form of farming and tends to produce larger farms, with hired as well as family labour, than are found in the countries with peasant workers. These two conditions are not found, to the same extent, in any other country except the eastern States of America.

We shall not be concerned by any means solely with agriculture carried on under such conditions ; but we shall devote considerable attention to them, perhaps more than is justified by their importance in world agriculture as a whole. From the point of view of numbers, most farmers are peasant farmers ; but a study confined to the economics of peasant farming would have little relevance to English or American conditions.

CHAPTER II

THE COMPLEXITY OF AGRICULTURAL PRODUCTION

§ 1. *The Nature of Agricultural Output.* Agriculture has been defined as “the science and art of cultivating the soil,” and this definition emphasizes the primary nature of plant production in agriculture. The main uses to which plants may be put are indicated in the following diagram.



They may be consumed in their plant form outside agriculture, or they may serve as the raw material for a further process which is itself part of agriculture, the production of livestock products. Some plants, such as fruit, rice, cotton, tobacco, etc., are consumed almost exclusively outside of agriculture; others, like wheat, barley, oats and potatoes are generally mainly so consumed, but are sometimes fed to livestock; others again, like maize, mangolds, turnips, and—above all—grass, are grown almost entirely as food for animals. The process of converting plants into animals

may take place on the same farm as that on which the plants are grown, or the animal feedingstuffs may be sold by one farmer to another. It is because, frequently, the same person performs both the primary function of growing plants and the secondary one of feeding the plants to livestock that these two industries are grouped together as agriculture ; we shall return to this point later.

The final output of agriculture, whether it be plants or livestock products, may be put to three chief uses ; it may be consumed as foodstuffs by humans, or as a fuel, or it may serve as the raw material of industrial production. Of these three uses human food is by far the most important, as is shown by the following list which ranks the world output of the twenty most important agricultural products according to their total value in 1927-30, at United Kingdom prices. It does not include the products of forestry.

- | | |
|----------------------------|----------------------|
| 1. Milk and Milk Products. | 11. Barley. |
| 2. Eggs. | 12. Sugar. |
| 3. Wheat. | 13. Rye. |
| 4. Rice. | 14. Tobacco. |
| 5. Pigmeat. | 15. Wool. |
| 6. Beef and Veal. | 16. Mutton and Lamb. |
| 7. Maize. | 17. Wine. |
| 8. Potatoes. | 18. Coffee. |
| 9. Cotton. | 19. Silk. |
| 10. Oats. | 20. Soya Beans. |

The eight most important of these products, and sixteen out of the first twenty, are foods or drinks. One further product, tobacco, is of a very similar type, and only three, cotton, wool and silk, coming respectively ninth, fifteenth and nineteenth on the

list, are raw materials for industrial production. The next most important product used in industry, rubber, is of considerably less importance. Products used as fuel do not appear at all ; while it is true that they are relatively unimportant, it must not be forgotten that the wood of trees, excluded from the list, is partly used as fuel.

The list gives total output of the various products, not output used for human consumption, since world figures of consumption are not available. Of the products given above, the greater part of the world output of maize, oats, rye and soya beans, and a not inconsiderable part of the wheat and barley, are fed to livestock ; thus they are counted twice, first when they are produced as plants, and secondly when they are finally consumed in the form of livestock products. Even if they be excluded, however, food-stuffs still remain by far the greater part of agricultural output.

The list also shows the importance of livestock as compared with plant production before the war. The two most valuable products in world agriculture were milk and milk products, and eggs, and the fifth and sixth pigmeat and beef and veal, all livestock products ; on the other hand, thirteen of the products, or nine if we exclude the four feedingstuffs mainly given to animals, are plants, as compared with seven animal products. This order of importance applies to the whole world ; in Great Britain animal products are even more important, representing in 1930-31 over 70 per cent of the total value of farm products sold. Since the war the percentage has been reduced.

We have already indicated the multiplicity of

agricultural products and their different nature ; from this aspect, if from no other, agriculture is not one industry, but many. A further complexity is introduced by the fact that any farm may be organized to grow one agricultural product only, or may include many products in its final output. Moreover, it may concentrate on one stage of production, either the primary or the secondary, or may integrate all the stages of production in a single farm. Examples can be found of all these forms of production. In Kenya and Brazil, for instance, there are plantations growing nothing but coffee ; the town dairy which used to supply London with its milk, or the poultry farm using only purchased foods, provide examples of farmers specializing on the secondary stage of production alone.

In England, however, mixed farming is the rule, specialization the exception. Very many products are often grown together ; thus a typical East of Scotland arable farm may sell wheat, barley, oats, potatoes, fat cattle, lambs and wool, and a farm in the dairying counties of England often sells calves, pigs, sheep, wool, eggs and wheat as well as liquid milk. Such farms are generally largely integrated organizations, in that they grow themselves grass, both pasture and hay, and roots to feed to their animals ; frequently, however, particularly if they produce milk, they also depend in winter upon purchased feedingstuffs, such as cow cakes ; moreover, they may buy a large part of their young stock from farmers in hill districts who specialize in breeding stock but cannot easily fatten them.

There are advantages both in specialization and in diversification, and their relative importance depends upon the particular circumstances of each farm.

§ 2. *The Advantages of Specialization.* Some of the advantages of specialization are obtained if a farm concentrates on any one product. They are similar to those resulting from specialization in industry and have been clearly recognized since Adam Smith's day ; since they are in no sense peculiar to agriculture we shall deal with them only very briefly.

The first advantage is that a farmer, if he concentrates on one product, can thoroughly master its conditions of production. The fewer commodities he needs to study, the more he can know about each one. The second is that he can obtain the advantages of specialized labour and machines without increasing the size of his farm to a point where his managerial difficulties become great. We shall discuss this point when we come to consider the most economical size of farm,¹ and shall find that it is of considerably less importance in agriculture than in industry.

Besides these advantages on the production side there are normally economies in marketing only one product. The farmer needs to know not only the conditions of production on his own farm, but also the probable prices that he will receive if he sells his output in different markets or to different merchants, and will be able to acquire such knowledge more easily and more thoroughly if he sells a few than if he sells many products. In so far, however, as an effective and competitive marketing system exists,² the farmer may be able in large measure to rely upon it. The costs of marketing, in addition, will be lower if each farmer sells a considerable volume of one product, rather than a small quantity of many goods.

¹ See pp. 50-59.

² See Chapter V.

Besides these advantages of specialization, as such, there are others obtained by growing a particular product in a special area. As we shall see later,¹ most districts have special advantages of soil, climate or distance from the markets which favour the production of some particular crop, and specialization makes it possible to exploit this advantage to the full.

Sometimes the difficulty of transport causes the entire predominance in an inaccessible area of a crop which is easily and cheaply moved; this was true of wheat in the prairie areas of North America towards the end of the nineteenth century.

Sometimes the peculiar advantages of the soil for some particular crop, or its peculiar unsuitability for any but one crop, outweigh all other considerations; little but cotton is grown in the Nile Delta or in some areas of the Mississippi Valley, sheep are the only product of certain barren mountain grazings in the British Isles, and cattle for milk or meat consume all the grass in some of the favourable pasture areas of England.

This advantage only applies when soil conditions are uniform over the whole of a farm; if the soil constitution varies from field to field, as it sometimes does, then the farmer will obtain better yields if he grows different crops on the different fields.

The economies obtained by specialization, though they may not be very great as regards concentration on some particular agricultural product, are usually overwhelming as between agriculture as a whole and industry as a whole. All the benefits to be obtained by specialization in industry prevent entrepreneurs from

¹ See Chapter III.

combining agricultural and industrial work. Nor is this all ; as we shall see later, there are great advantages to be derived from setting up industries in one district, agriculture in another, while the most profitable size of business is large in industry, small in agriculture. For all these reasons industrial and agricultural work are rarely combined in the same business.

§ 3. *The Advantages of Diversification.* Those advantages of specialization are frequently more than counterbalanced by others, many of them peculiar to agriculture, obtained by growing a number of products on the same farm. Firstly, it is easier to maintain soil fertility ; secondly, it may be possible to fit in two different crops in one year ; thirdly, labour requirements can be spread more evenly over the year ; fourthly, transport costs are reduced if the farmer grows on his own farm a considerable part of what he consumes ; fifthly, the risk of crop failures is diminished ; sixthly, the farmer's income is spread more evenly over the year ; and, finally, if the different stages of production are integrated, the costs of transporting the intermediate products are eliminated.

Different crops require different things from the soil ; the combination or rotation of crops may therefore utilize more fully the properties of the soil than does concentration, year after year, on one product. Thus cereals use a great deal of nitrates, but few sulphates ; cabbages, on the other hand, take much sulphate from the soil, while clovers take a lot of lime and root crops make heavy demands on phosphates. If different crops are grown in successive years they will draw on different salts ; moreover, it is often possible to restore the

elements which one crop removes by planting another which restores them. Thus corn crops, which use up the nitrogen in the soil, can be alternated with leguminous plants which, through the nodules on their roots, convert the nitrogen from the air. Or the fertility of the soil may be restored by folding or grazing animals on fields where corn crops or potatoes are intended to be planted, since dung is an excellent fertilizer. Occasionally, also, the alternation of animals and crops on some fields maintain the soil in a good texture; thus some light soils, suitable for barley growing, can only be kept in the right condition by previously folding sheep on roots, so that such farms will sell both barley and sheep. Again, the soil will be kept in better condition if deep- and shallow-rooted crops are alternated.

Next, the rotation of crops facilitates the destruction of weeds, since it permits cleaning operations at different times in different years, and thus prevents any type of weed from flourishing and spreading year after year. Finally, diseases, such as the finger and toe disease in turnips, are more likely to occur if the same crop is grown year after year on the same land.

There are other ways of maintaining fertility, texture and cleanliness than the rotation of crops. The salts which are taken from the soil by any crop can generally be restored by applying suitable fertilizers, the texture of the soil can sometimes be maintained by various types of cultivation, and weeds removed, if no other method is possible, by hand, or by leaving the soil fallow for one year, with no crop upon it. These methods, however, add to the cost of production, so

that it is often cheaper to rotate the crops grown on any field.

The second advantage of diversification applies only to a few products. Occasionally it may be possible to grow two different crops on the same field in one year, when it would be impossible to plant and harvest the same crop twice. Thus early potatoes, in England, are planted about March and lifted in June or July, and can be succeeded by rape, which can be cut or folded with sheep in the autumn or winter.

The third advantage lies in the more even demand for labour throughout the year if several crops are grown. The worker must co-operate with the forces of nature at the season when his assistance is needed, and, if only one product is grown, the demands for labour will be very variable between different times of the year. For some livestock, it is true, such as cattle, and, above all, milk, labour requirements are fairly evenly distributed over the year, but others, such as sheep, require more attention in the lambing season. The labour requirements of almost all crops, moreover, have very definite seasonal peaks at the planting and harvesting seasons, and sometimes at other times when weeding or thinning is required. Thus, in England, a peak amount of work must be done on the corn crops in the planting season, October for winter planted varieties and March for spring planting, and in the harvest season, August and the beginning of September. Roots require the maximum amount of labour in the spring and early summer, and, still more, at the pulling season about October, while hay-making makes its maximum demands at the beginning of July.

To a limited extent farmers in different areas are able to make use of an itinerant labour force, such as the fruit pickers who follow the ripening of the fruit from Cornwall to the Hampshire strawberry fields and the Vale of Evesham orchards, or the hop pickers who arrive in Kent from London. Generally, however, costs are increased if labour has to move from farm to farm, and a farmer can decrease his expenditure on labour by dovetailing the labour requirements on different crops. Thus on twelve farms in the Eastern counties, while the number of hours per fortnight spent on different crops varied, between minimum and maximum, from nothing to about 800 per cent of the average for the year for hay, to about 600 per cent for wheat, 500 per cent for spring barley and mangolds, 400 per cent for oats and potatoes and 300 per cent for sugar beet, yet the variation in the total hours worked was only from a maximum 14 per cent above the yearly average in mid-July to 12 per cent below in early February—about the same variation as in the labour employed on cattle and pigs, though more than in that used for milking.

The fourth advantage of producing a number of commodities is that, since the farmer and his family wish to consume a variety of foods, transport and selling costs will be reduced if the farmer himself can grow more than one of them. In a sparsely settled country the necessity of feeding his own family is undoubtedly important in determining what the farmer will grow, but in a closely settled country like England it is of comparatively little importance.¹

The fifth advantage of diversification is that it

¹ See p. 74.

enables the farmer to spread his risks. If he concentrates on one product, a harvest failure or a price collapse may ruin him ; by producing several saleable goods he avoids putting all his eggs in one basket, since it is unlikely that many products will all fail during the same year. He may prefer a rather lower expectation of profit if he can have a greater certainty of receiving it.

Sixthly, if a farmer produces only one specialized crop, he will be paid for it only once a year, whereas, if he produces several, animal as well as plant, his income will be more regular. In so far as he must borrow in anticipation of his receipts, if these are variable, he will be better off if he can avoid this irregularity in payments. Once again, this objection to specialization does not apply to milk production, which can be sold throughout the year. In any case it is not of major importance.

The final advantage is obtained only by integrating the different stages of production on the same farm, and so avoiding the costs of transporting and selling the intermediate products. Thus, if a farmer grows the hay and roots consumed by his cows, or the grain fed to his chickens, this product will not have to be carried from farm to farm ; moreover, the cheapest summer foodstuff, growing grass, cannot be transported at all. These considerations apply also to the use of by-products which are expensive to transport. Thus the farmyard manure which livestock produce is a valuable fertilizer of crops, particularly of potatoes, and it is therefore convenient that livestock and arable farming should be undertaken on the same farm. The skim milk or whey which remains after butter

or cheese is made can be fed to pigs ; this is the basis of the combination in Denmark of butter and bacon production. The tops of sugar beet are an excellent cattle food, so that cattle and sugar beet are frequently found on the same farms.

For all these reasons the total costs of growing a number of products on one farm are often, but not always, lower than if each product were grown on a farm specializing on it alone. Farmers in many areas can reduce their costs by growing several products, but not necessarily by producing a large number of commodities. The advantages of diversification can often be obtained when only a few carefully selected products are grown, and a considerable part of the art of managing a farm consists in so planning that as great a part as possible of the economies both of diversification and of specialization can be obtained. Thus some farmers organize their livestock production in departments, each in charge of a specialist, and each unit of a size sufficient to keep him fully employed ; they may, and usually do, produce crops as well, but these are cultivated by a special labour force, distinct from the livestock specialists. It is thus possible to dovetail the labour requirements on the various crops ; moreover, in so far as there are peak labour requirements for the livestock, as in the lambing season, the specialists can be assisted by workers transferred temporarily from the general labour force normally employed in cultivating the arable land. Such an organization, of course, is only possible on a large farm ; we shall refer to it again when we discuss the advantages and disadvantages of large farms.¹

¹ See p. 55.

The advantages of diversification, it should be noted, apply almost wholly to the combination of different agricultural commodities on the same farm, and only very slightly to the association of farming with other types of activity. It is possible, however, to use some of the farm labour force, at times when there is no farm work to do, on such occupations as handicrafts. It will not pay to install much machinery for industrial work, since labour will only be available occasionally to work it ; therefore the cost of producing these products will generally be higher than the cost of rather similar products made in factories. There may, however, be some demand for hand-made goods, so that some combination of handicrafts and agriculture may be advantageous ; but it can never be very important. And it becomes less important as labour costs rise relatively to other costs.

§ 4. *The Importance of Joint Products.* The adjustment of agriculture to changing conditions is made very much more complicated than that of industry by the existence of so many interrelationships between the different products on the supply side. To begin with—though this is not peculiar to agriculture—all farm products represent a composite demand for land, and for the labour and capital which is available to produce them ; to this extent all products compete with one another, so that an increase in the output of one will tend to decrease that of others. Some products, also, compete especially with a few others ; thus wheat and barley often take the same place in the rotation, while milk and beef are alternative products from the same cattle.

On the other hand, on a mixed farm, a large number of commodities are joint products, since an increase in the output of one facilitates the production of another. Thus all the crops produced in a typical rotation are joint products, as the output of one can only easily be increased by expanding also that of others; the old Norfolk four-course rotation—now largely abandoned—was seeds fed to cattle, wheat, roots fed to sheep and barley or oats, and, to a considerable extent, these four products were joint products. Again root and cereal crops use labour at different times of the year, while the dung produced from livestock is valuable as a potato fertilizer. Examples of such joint products could be multiplied; in no case is it absolutely essential that the various commodities should be produced together in fixed proportions, but variations from the ordinary rotations are troublesome and can only be made, to any large extent, by reorganizing the whole system of farming.

The combination of processes on a mixed farm does not, moreover, provide the only examples of joint products in agriculture. Even when farmers specialize in producing one crop or one type of livestock, they will frequently have several final products to sell. All the classical examples of joint products, mutton and wool, beef and hides, cotton and cottonseed, are agricultural products, and these examples, moreover, are far from exhausting the list. To take only a few more, there are wheat and wheat offals, a valuable food for livestock; butter and skimmed milk; and cheese and whey. Milk, moreover, is a joint product with the inferior cow and bull beef obtained from breeding stock; eggs are joint products with cockerels

and old fowls ; a sirloin of beef is a joint product with loin and shin, and neck of beef. Very frequently the farmer, concentrating on one plant or animal, nevertheless produces a number of commodities in proportions which can only be varied within limits which are often narrow. It is clear that this adds to the difficulties of adjusting agricultural output to changing demand.¹

¹ See p. 116.

CHAPTER III

DIMINISHING RETURNS AND THE LOCATION OF AGRICULTURE

§ 1. *The Importance of Land in Agriculture.* Even in England, almost the most industrialized country in the world, about 82 per cent of the surface is devoted to farming, and a further 5 per cent to woodlands, leaving not more than 13 per cent for all industrial and residential purposes, for roads, railways, aerodromes, etc.

One reason for this preponderance is that food, a prime necessity of life, is an agricultural product, and that the world is still so poor that it must devote a great part of its resources to the production of necessities. Moreover, over a large part of it, mineral resources and power supplies are scarce, so that people who settle there have no alternative occupation to agriculture. This, however, is but a small part of the answer. Only about 10 per cent of the population of Great Britain is employed in agriculture, and yet this 10 per cent uses 82 per cent of the area.

The second reason is that agriculture is the only industry which requires the extensive use of land as a factor of production. The forces of nature which are associated with different parts of the earth's surface are, in a sense which is rarely true in industry, active partners in the process of crop production, and, though to a lesser extent, in that of livestock production. The chemical constituents of the soil com-

bine with the seed to produce the plant, and its growth is affected by the geological constitution of the soil. Plants and animals, for life and growth, need access to light and sun and rain, all of which are associated, in varying amounts which can be affected only to a minor extent by man, with different parts of the earth's surface.

§ 2. *Diminishing Returns.* It is because of this co-operation between nature and man, because man can only help nature to do its work in agriculture, that the more intensive cultivation of the soil leads to diminishing returns. The importance of this tendency can hardly be exaggerated and we shall find it constantly recurring in the chapters that follow. It is one of the chief circumstances differentiating agriculture from industry, for land is the main factor of production fixed in amount, and agriculture the only group of industries so peculiarly dependent on land. It is fundamental, also, in determining the location of agriculture, since it is only because of the fact that an intensification of production on any acre of land involves greater costs of production that there is a scarcity of the best land—best either because of location or natural advantages such as fertility or climate.

The operation of diminishing returns from labour is most easily seen by considering first the activities of an isolated family, without exchange relationships with others. From this we can proceed to consider the three chief complications introduced by the establishment of exchange relationships with other people. Firstly, agriculture will have to compete with industry for its labour force. Secondly, the farmer will be able to use

purchased machines as well as labour and simple home-made tools to cultivate the soil. Thirdly, he will have to sell part of his output to other people, many of whom will live in cities. The location of agriculture is profoundly affected by the attraction of city markets ; we shall examine the nature and effects of this attraction, and of the other influences, of which soil fertility is the most important, which modify its effect.

We shall begin with the isolated family, using only such tools as it can make itself. These simple capital goods we shall group with labour. In a country where land is available in unlimited quantities, free, this family will establish itself in that place where it expects to produce the largest output with the least effort ; in other words it will choose the soil which appears most fertile under the existing conditions of knowledge and technique. It will then proceed to cultivate that amount of land which, in co-operation with the quantity of work it is prepared to do, will yield the greatest amount of product.

Although a large part of the process of agricultural production is a natural one, yet some assistance from man is essential. He must plant the non-indigenous crops he wishes to consume or to feed to livestock, he must harvest those that are designed for direct consumption, or are not eaten by livestock as they stand, and must milk, shear or kill the livestock. One man can undertake these tasks only on a limited acreage, and it will probably pay him to concentrate his labour on less land, and to do rather more than these minimum operations. If two men work on the area where one had previously been, they may be able, also, to fence

the crops to prevent their destruction by livestock, to harrow the soil as well as plough it, etc., and may thereby more than double the output. Then the additional product obtained by putting a second worker on the land would be greater than the amount produced by the original worker only, and the land would be giving increasing returns to labour.

If a third man joins the two already working on the fixed acreage it is possible, again, that he could undertake such important tasks that the total product, with three men working, exceeded that when there were only two by more than the product added by the addition of the second man. In other words, the marginal return might still be increasing, and increasing marginal returns still operating. But, in agriculture, there would very soon come a point when the marginal return added by the employment of another man on the same amount of land would fall. It is possible to increase the yield of the soil by additional cultivation, by hand weeding, etc., but, very soon, equal increases in yield can be brought about only by employing proportionately more labour. Plants grow less well if they are crowded together, since each takes part of the goodness of the soil from the others, and excludes part of their light. In other words, diminishing marginal returns from labour soon begin to operate in agriculture.

If, however, marginal returns first increased before they began to fall, average returns will not turn downwards so soon as marginal. As marginal returns fall average returns will increase at a slower rate than before; and for some output marginal and average returns will be equal. After this point average returns

as well as marginal will fall, but marginal will decline the more rapidly.

If all land in the neighbourhood were of equal fertility, it would be to the best interests of the family to cultivate just that area which, with the amount of labour available for work on it, would show, on each acre, the maximum average output per unit of labour used. If this amount were farmed, each acre would be cultivated up to the point where it ceased to show increasing average returns from additional labour and where the average returns from more labour were about to diminish. This would be the most profitable acreage to use, since the return to labour would be less either if more land were cultivated less intensively or if less land were cultivated more intensively.

If the land varied in fertility, it would very rarely pay to farm all units just to the point at which average returns begin to diminish. So long as the number of workers required to secure the highest possible average return from the less fertile land would add more to the product of the more fertile land by intensifying its production than they could secure on the less fertile land, it would pay to use them all on the more fertile land and ignore the less fertile. For their total output would be greatest if this were done. In other words, it would pay to work the more fertile beyond the point where diminishing returns began to appear. There would, however, fairly soon come a point where, owing to diminishing returns as production was intensified, a greater product would be secured by diverting to the less fertile land additional workers sufficient to secure its highest average return. And, once the less fertile land had been brought under cultivation,

additional workers should be so distributed between the less and the more fertile land as to secure on each an equal marginal productivity for the last worker with his simple tools. For this would secure the greatest total product from the available land and the available labour force.

A large amount of land would, therefore, be drawn into agricultural production as the amount of available labour rose, because of the increasing cost of intensifying production. If the various acres of land differed only slightly in fertility, the area cultivated would be greater than if they differed by a good deal. Similarly if returns diminished rapidly on the more fertile land as its cultivation was intensified, less fertile land, also, would soon be drawn into farming. For both these circumstances would lead to the additional return from further workers on the most fertile land soon becoming less than they could produce on less fertile land.

Thus there are two margins of cultivation, the intensive and the extensive. Although the total return to labour on the more fertile land is greater than on the land which it just pays to cultivate at the extensive margin, its marginal return, the intensive margin, is the same on both lands. For the more fertile land is cultivated more intensively until its marginal return does decline to that obtained on the least fertile land in cultivation.

On the extensive margin the product will be just great enough to induce the farmer to remain in business, but land more fertile than this will provide a greater product or income. The difference between the total product on the more fertile and on the least fertile land cultivated, the marginal land, after allowing for

the extra labour used on the best land, represents its rent, the charge which the owner of the land can make to any farmer who wishes to hire it. It is obtained because there is a scarcity of the more fertile and consequently more productive land, and because, since cultivating this land more intensively results in diminishing returns, other, less fertile land, must also be used. Consequently, farmers will bid against each other for the use of the better land, where they can obtain a greater total return for their efforts, and its owners will be able to charge a rent for its use.

We can now abandon the assumption of an isolated, self-sufficient family, and consider the more common case of farmers in trading relationships with a community partly occupied in other tasks, some in other branches of agriculture and some in industry. This relationship will, first, give the farmer and his family alternative occupations, so that agriculture will have to compete with industry for its labour force. When dealing with an isolated family, we took the labour supply as fixed by outside forces so that the marginal return to that labour was determined by the rapidity with which returns diminished as labour was applied more intensively. Thus if, in the accompanying diagrams, MM^1 measures the marginal return to each worker, then, as the number of workers on a given piece of land¹ is increased, it will slope downwards from left to right owing to diminishing returns. If, in Diagram I, the number of workers is fixed at OQ , the return to each will be equal to QR , the

¹ Since the diagram assumes falling marginal returns throughout, it ignores the complications described on p. 25 which result from marginal returns beginning to fall before average returns.

amount cut off by MM' from the vertical line corresponding to this number of workers.

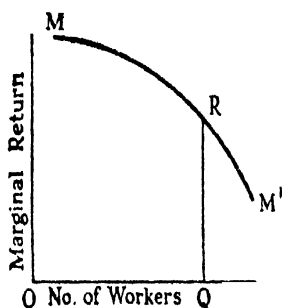


Diagram 1.

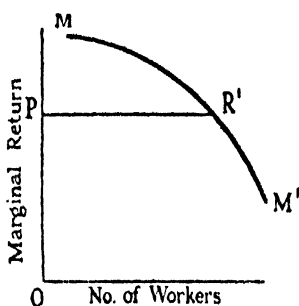


Diagram 2.

MARGINAL RETURNS PER WORKER.

When labour is completely mobile and there are several occupations, wages must be equal in all occupations; the conditions which determine the general level of wages are a matter for general rather than for agricultural economics, so that we shall take them as given. Labour will be used in agriculture so long as its marginal return exceeds the ruling wages expressed in terms of the number of units of product which the money wage can buy; when, however, the marginal return falls below the wage level no more workers will be employed in agriculture, since there would be a loss on their employment. Thus, in Diagram 2, the wage level, or the return to each worker, is fixed at OP , and the number of workers will be determined at PR' , where the horizontal line measuring the wage level cuts MM' , the curve of the marginal return per worker. In other words, the number of workers in agriculture, rather than their wage, is determined by the curve of marginal returns or productivity; the

curve of productivity only determines the level of wages in so far as it affects the general level of wages.

Secondly, when the family is no longer isolated it will be able to obtain machinery and fertilizers produced by others to help it with its work. There are some processes where the introduction of more complicated machines will greatly increase productivity; thus the plough and the threshing machine are far more effective than hand labour. Again, some fertilizers add very greatly to the output of land. In just the same way, however, as the return from increasing applications of labour to the same land soon begins to diminish, so does the return from increasing use of capital goods. It is possible to increase yields, up to a point, by different cultivations, or by the application of more fertilizers. Thus the first hundredweight of fertilizer used on each acre may increase yields by 20 per cent, the second may improve them by no more than, say, 10 per cent, the third by 5 per cent, and so on. Other types of capital investment, equally, will yield diminishing returns after a certain point. The amount of capital used in the various forms will depend upon its cost, and upon the marginal return obtained from it. Exactly the same analysis can be applied here as that developed in the last paragraph for labour. The faster the marginal return from capital declines as more capital is applied to land, the less intensively will it be used.

So far we have discussed the diminishing returns obtained from additional labour or purchased capital goods applied to land on the assumption that the amount of the other factors remains constant. This is, of course, an oversimplification. The true relation-

ship is a joint one ; the quantity of one factor that it is most profitable to use on an acre of land depends to a large extent on the amount of the others that are available. Thus, when machines are used, the quantity of labour that can most profitably be applied per acre of land will almost certainly be reduced, as machines will be substituted for hand labour in some operations. On the other hand, the introduction of fertilizers may easily increase the most profitable quantity of labour to use per acre, since it will have a new task to perform in applying the fertilizers, and since the heavier yield per acre caused by using them will require more labour to harvest it.

§ 3. *The Market in Relation to Industry or Agriculture.* Thirdly, the introduction of an exchange economy will mean that land is no longer valued purely for its fertility or natural advantages, that is to say, for its capacity to produce a larger crop than other land in response to the same application of labour and capital. Its value as a factor of production will now depend also upon the relationship of its situation to that of other forms of activity, from the sides both of selling and buying.

Towns, whether they result from industrial concentrations or from other causes, historical, protective or commercial, exert a double pull on agriculture, in so far as the finished product costs less to transport if it is grown close to the market, and as goods produced by industries in the market and required on the farm, such as machines and fertilizers, can be obtained more cheaply.

There may, also, be two forces apart from the

competition of alternative demands for land tending to push farming away from the towns. Firstly, some raw materials, such as natural fertilizers drawn from sources in the country, may be cheaper there. Secondly, money wages may be lower. In a static community real wages, after allowing for people's preferences for living in rural or urban areas, would be equal in country and town, and money wages higher or lower according to whether the cost of living was greater or less. Unprocessed foodstuffs and rents tend to be cheaper in the country, while processed foodstuffs and industrial products are often dearer, so that the average level of the cost of living depends upon the relative importance of these different elements. In most actual communities, however, as we shall see later, the position is not static, and wages tend to be lower in the country than in towns almost irrespective of differences in the cost of living.¹

Most commonly, the cost of transporting the finished product is of far greater importance than the other items. The annual cost of machines forms but a small part of the cost of the finished product, and few non-farm raw materials are generally bought, so that variations in their price are of comparatively little importance. Wages of agricultural workers, also, do not vary between town and country by so much as does the price of the product. We shall therefore concentrate our attention upon the costs of transporting the finished product to market, which is, as we have seen, a factor tending to attract agriculture to the market. Nevertheless, in spite of this attraction, it is industry that tends to gravitate to the areas

¹ See pp. 136-7.

round the markets, ousting agriculture from this favoured position.

The reason for this lies in their different intensities of production per acre of land. In agriculture, diminishing returns prevent a large weight of output per acre. Industry, on the other hand, needs land only as a place upon which production can be carried on, as a standing-place for men and machines and for necessary stores of raw material and finished product. Even if the most desirable land were available free in unlimited quantities, industry would not extend over a very large area, since workers must help each other at the same machine and foremen must be able to see what is going on. The cheapest factory is often the single storey type, with ample space for storage ; but it is possible to double or treble the output from a piece of land by building two or three storeys, at an increase in costs per unit represented only by the additional expense of a rather stronger building and the added difficulties of transport up and down stairs. This additional expense will involve some decrease in the marginal return from the same amount of land, but one that may be small until a number of storeys have been built. Diminishing returns from land will, therefore, not become crucial in industry until a very much greater weight of product is manufactured on the land than could possibly be grown on it in agriculture.

To a considerable extent the large number of people employed per acre in industry means that industries themselves create towns, and hence markets both for industrial and agricultural products. In addition towns, in themselves, tend to attract industries. The

attraction depends—generally speaking—on the weight of product produced per acre. If 100 tons of saucepans are manufactured per acre, and only 1 ton of wheat grown, then, if transport costs are proportional to weight, the savings obtained by manufacturing saucepans close to the market will be 100 times as great as the savings from growing wheat there. For this reason industry will be able to offer a higher price than agriculture for land which, because of its position in relation to the market, is most desirable for both occupations. It is the relative pull of the market, not its absolute pull, which is the deciding factor, so that agriculture will tend to be pushed outwards from the market by industry.

Of the area available to agriculture, other things being equal, that nearest to the market will be the most productive in terms of value, and will therefore be the most intensively farmed. Just as production is intensified on the more fertile land beyond the point where diminishing returns begin to appear, so it will be on the more accessible lands. It pays the farmer to go on applying labour and capital to land so long as the addition made to his costs is less than the addition made to his revenue, which is equal to the additional product obtained multiplied by its price.¹ The physical productivity of the same amount of labour and capital is higher when the land is fertile than when it is not, while the price obtained may be the same. When the land is nearer the market the physical productivity of any application of labour and capital may be unaffected, but the price at which the product can be sold will be higher than for

¹ When the commodity is sold in a competitive market.

more distant land. Whatever the reason, if marginal revenues are higher on some lands than on others, production will there be intensified beyond the point at which diminishing returns begin to appear. The more fertile or the more accessible is the land the more will it be cultivated; it will only be on marginal land, land which, because it has few advantages of climate, soil or location, is only just worth cultivating, that labour and capital will not be used beyond the point at which diminishing returns begin to appear. Moreover, just as the more fertile land obtains a rent because it is scarce, so will the more accessible land. Thus, in 1941-3 agricultural rents in Lincolnshire averaged about three times, and in Middlesex twice as much as in parts of Wales. In Lincolnshire fertility was probably the more important reason, in Middlesex proximity to the market, for this difference.

§ 4. *The Market and Types of Farming.* So far we have neglected the fact that agriculture produces not one product but many. Any theory which sets out to explain the location of agriculture must account, also, for the distribution of different varieties of crops and livestock over the agricultural area. Here again, as was shown by Von Thünen, the market exerts a different pull on different products, due mainly to transport costs, though variations in the amount of labour required per acre of the different products may also be of some importance.

The costs of transportation depend partly upon the weight and bulk of product grown per acre and partly upon its perishability and fragility. Perishable goods cost more per unit of weight to transport than do

those which are not liable to damage if they are delayed, since trains or lorries carrying them must travel fast and often at inconvenient times of day, while for really long distances special refrigeration must be provided in transit. Fragile goods have to be carefully packed, which increases both the weight and the bulk of the goods which have to be carried.

Because of the difference in transport costs, those people who wish to grow the heaviest yielding or bulkiest products or the most perishable will be willing to offer a price higher, compared with more distant land, for the accessible land than will other farmers, since they will save more in transport costs if they obtain the land than will farmers who are producing a lower weight per acre. If their product is worth growing at all they will obtain the land nearest the market.

If transport costs were the only factor, then, the market would tend to be surrounded by zones, the nearest being industrial, the second containing the highest yielding and most perishable products, and so on. In the inner zone would be industrial production, with a high output per unit of land, but an output which decreased as the city became more distant. Beyond the industrial zone farmers would grow perishable fruits and vegetables and potatoes, which yield heavily per acre and are bulky in proportion to their weight. Next would come milk, then wheat, then butter, and finally meat from cattle and sheep grazing on inferior grass, and consequently requiring a large area each. Beyond that the land would not be used for agriculture.

On the marginal land, at the outer edge of the grazing area, no rent would be paid, and the price to the farmer

for sheep and cattle would equal the costs of producing them, including the farmer's profit. As the market was approached the price to the farmer would increase according to the distance travelled and the cost of transport, and land would command a rising rent because of the rising prices. The margin of transference between grazing and wheat production¹ would come when each product could offer the same rent for the land, because receipts per acre for each product exceeded its costs of production per acre, excluding rent, by an equal amount. If the cost of production per acre were the same for each product, then total receipts per acre would have to be the same, and the prices to the farmer inversely proportional to output per acre. Thus, since the amount of wheat produced per acre is more than the weight of sheep, wheat prices per cwt. would be less than sheep prices. In so far, however, as wheat costs more per acre to produce than sheep, this difference in price per cwt. would be diminished. Usually, however, the product with the smallest output per acre, grown the furthest from the market, would remain the most expensive per unit of weight.

Nearer the market than this margin of transference only wheat would be grown, and the farm price of wheat would rise as the market was approached by the cost of transporting each hundredweight to the market, while land rents would increase by the cost of transporting the product of an acre of wheat. Since more wheat than sheep is grown per acre, rents would rise more steeply than in the sheep zone. At the inner

¹ For a full discussion of the margin of transference see *Supply and Demand*, by H. D. Henderson, Chapter VI.

edge of the wheat zone there would again be a margin of transference, this time between wheat and milk, and so on. As the market was approached rents would rise, at a progressively faster rate within each zone, while within each zone, again, the production of each crop would be intensified as one moved from its outer to its inner margin of cultivation.

The prices of the products on the market would have to be equal to their farm price plus the cost of transporting them from the farm to the market, which would be affected by the width of the various zones. The demand for them would depend upon the size and income of the consumers in the market, and upon their price there. The width of the zones would be determined by the demand for the various products grown within them, and by the amount per acre produced. This, again, would depend upon the rapidity with which returns began to diminish as production was intensified, and upon the level of transport costs. The higher, relatively to agricultural prices, were costs of transport, the more intensively would the most accessible lands be cultivated and consequently the narrower would be the zones. The more rapidly costs rose as production was intensified, the more would it be necessary to extend production, in spite of higher transport costs, and consequently the wider would be the zones.

All the determining factors are thus interdependent, as is generally true for any economic problem. While, however, the width of the zones and the prices of the products cannot easily be arrived at, this is not true of the relative position of the different zones. On our present simplified assumption that only transport costs per acre vary for different products, this depends

wholly upon the relative cost of transporting the products grown on one acre; the greater is this cost, the more strongly will the product be attracted by the market.

If transport costs depended wholly upon the distance from the market, the Von Thünen zones would lie between concentric circles with the market at their centre. In fact, of course, transportation is cheapest along the main traffic lines, railways, roads, navigable rivers and the sea, and is cheaper by water than by land. The zones will consequently recede further from the market along these arteries and along the coast, and approach nearer where they are absent. Thus butter is made in the small mountain farms of South Wales even though liquid milk, a product much more expensive to transport, is sent to Cardiff from the wider valleys all round them.

Moreover, the regular arrangement of the zones depends upon the assumption that there is one market to which all production in any area is sent. In fact, of course, the districts from which many large towns draw their supplies overlap, thus contracting the area from which products can be drawn in some directions and forcing them to push out in others. Moreover, every village, and even every household, is a market in itself. Therefore, so long as the only variable condition is the attraction of the market, each farm household will tend first to grow for itself, and perhaps also for its non-farm neighbours, those products most expensive to transport, and will use only the remainder of its resources for producing those goods for the central market which are rendered most profitable by the zone in which it is situated.

Further, account must be taken of the fact that many agricultural products are not consumed in their original form, but are converted into products which weigh less. In so far as conversion can take place cheaply on a small scale on the farm, the relevant costs of transport are those of the final product. Thus roots such as mangolds or turnips are fed to livestock on the farm, and it is the output of milk or meat per acre and not of the roots that determines their location. When milk is made on the farm into butter or cheese, the same is true. When, however, processing is most cheaply carried on in factories on a large scale, as is often true nowadays for butter and cheese and always for sugar, then, since the raw product, the milk or sugar-beet, is expensive to transport, producers will cluster round a factory. The factory itself will tend to be set up in a zone determined by the costs of transporting to the central market the finished product, the butter, cheese or sugar.

§ 5. *Other Factors Affecting Localization.* In actual practice, of course, the zones are modified by many factors unrelated to transport costs. Firstly, natural conditions favour sometimes one product, sometimes another. Secondly, the advantages of mixed farming encourage the production of several goods on each farm. Thirdly, labour is cheaper in some countries than in others, and, finally, Governments interfere with the natural distribution of production.

Probably the most important modification results from the natural conditions associated with different areas. The relative positions of industry and agriculture may be slightly changed by the varying

fertility of land, since, although the costs of industrial production are unaffected by the constitution of the soil, those of agricultural production are lowered when it is fertile. Thus agriculture will be able to increase its offer for fertile soil, and may succeed in obtaining fertile land near the margin of transference from industry to agriculture, instead of slightly more distant but less fertile soil. Near the market, however, even though the soil would yield well if used in agriculture, it will nevertheless usually be devoted to industry or housing, since its value in these uses will be increased by more, owing to its proximity to the market, than it would be in agriculture owing to its greater fertility. When an industrial concern takes over some of the most fertile farming land in Middlesex, we must recognize that this is a natural development in an area so near to the London market. The soil may be very productive in agriculture but its position renders it more valuable still to industry. If the use to be made of land is determined not by free competition but by planning under the powers conferred by the new Town and Country Planning Act, these considerations should still be taken into account.

Far more important modifications in the zoning of different farm products will be made as a result of varying fertility. No individual crop differs as much in yield as does the weight of farm and factory output per acre, so that distance from market is not such an overriding consideration between different crops as it is between industry and agriculture.

Land varies both in the fertility of the soil, in its topography and in the temperature and rainfall to

which it is subjected, and some pieces of land are more suited to one product than to another. To take an extreme case, it would be impossible, except at a very high cost, to grow bananas or coco-nuts in England, whatever the attraction of the market. Even within one climatic zone, moreover, some products grow better in some areas than in others. Thus the potato acreage of England is not spread evenly throughout the country at an equal distance from the main markets, but is to a large extent concentrated in the alluvial areas round the Humber and the Wash, in the Fens and in Lancashire, where the soil is particularly suitable for its growth. Again, dairy cows are more numerous in the West of England than in areas at equal distances from London to the east, because the damper climate of the West promotes the growth of grass. If the superiority of the soil on some more distant land reduces the relative cost per acre of growing one product, such as potatoes, with a heavy yield, as compared with another, say wheat, with a lighter yield, by more than the extra costs of transport, then potatoes will be grown on the land more distant from the market.

The distribution of production by zones will, secondly, be considerably disturbed by the reduction in costs of production often achieved if several products are grown on the same farm.¹ It may not pay the farmer to concentrate on that one crop which the joint effect of the attraction of the market and of the natural conditions of soil and climate would render most profitable if he could grow only one product, since the total costs of production and marketing may be lower if he grows several products.

¹ See pp. 13-19.

Thirdly, our analysis must be expanded to apply to the international distribution of agriculture. To a large extent Great Britain acts as a market for the agricultural areas of the world, and agricultural activity in Denmark, Argentina, New Zealand, Australia and many other countries is directed towards supplying the British market. Here we must abandon our original assumption that real wages tend to be equal everywhere. Since labour is only very slightly mobile between different countries, standards of life tend to be lower in countries where natural resources and developed skill are low in relation to the population. It follows that land will be cultivated in such countries even though the return to it per worker is less than could be obtained by farming more intensively the existing land and bringing more land into cultivation in the more favourably situated countries. The inhabitants of the country must concentrate on those things where their relative disadvantage is least, since they cannot move to other countries where their disadvantage would, partly at least, disappear. Consequently, farming will be carried on in heavily populated countries, and often carried on for export as well as to supply domestic needs, even though the land is infertile and the main markets distant, if the facilities for industrial production are even worse.

Finally,* the movement of products between countries is often hindered by deliberate Governmental restrictions as well as by the costs of transport, and the production of certain goods within countries is sometimes subsidized or otherwise assisted by the Government. These interferences will be considered in Chapter

IX. In so far as they exist, they obviously modify the distribution of production internationally; thus sugar is grown in the form of sugar beet in Europe, although the cost of producing it in the form of sugar cane in the West Indies is far lower. Such circumstances as these cannot be explained in the light of the analysis developed in this chapter.

§ 6. *Conclusion.* The actual location of agriculture will result from the balancing of all these factors. Within any country there will be a different optimum pattern if attention is directed solely to the attraction of the market, the variations in productive power of different crops on different soils and in different climates, or the advantages of diversification. The actual distribution will depend upon how rapidly both selling and production costs increase as these various optima are departed from. Sometimes, as we have seen, the advantages of distance from the market outweigh all other considerations, and only one product is produced in one area.¹ Normally, however, all the factors exert their influence. No one crop is produced in the zones immediately surrounding the market, but the perishable fruits and vegetables, potatoes and milk occupy a larger place in the farm economy than they do further out. In the areas distant from the market no perishable or heavy crops will be grown, except for domestic consumption, but there will be some rotation of the crops which are easy to transport. At all distances from the market, soils particularly suited to one product will grow a larger proportion of it than would be expected at such a distance from the market.

¹ See p. 12.

The combined effect of diversification and of the attraction of the market is best shown by comparing typical crop rotations in areas near to or distant from the main markets. An arable farm near a large market will often manage a rotation which includes potatoes once every three or four years, alternating with wheat and with seed-hay to feed milking cows ; the remainder of the cattle food will be bought from other areas. A farm distant from the market will not grow potatoes at all except for its own consumption, but will have two corn crops in a five- or six-year rotation, and grow in the remaining years roots and grass to feed to the livestock.

The effect of all these factors is shown in the sources from which the large British industrial cities drew their food supplies before the imposition of restrictions on imports.

The attraction of the market was such that almost all the liquid milk was home produced and virtually all the heavy main-crop potatoes¹ ; early potatoes, however, can only be produced so soon as March, April or May at heavy cost in the unsuitable British climate, so that supplies had to be drawn from warmer countries. The next four products, pigmeat, vegetables, poultry and eggs, are all rather perishable, thus giving an advantage to products produced near the market. For the more easily transported commodities a larger and larger proportion was imported from distant countries, until for butter, a product which can easily be grown in the British climate, but of which a very small weight is produced per acre, only 13 per cent was made at home. The last four products on the list are goods which cannot easily be grown under English conditions.

¹ See table on next page.

THE PERCENTAGE OF GREAT BRITAIN'S FOOD SUPPLIES
WHICH WERE HOME GROWN, 1924-28¹

	Per cent
Liquid milk	100
Potatoes	90
Pigmeat other than bacon	82
Vegetables other than potatoes	75
Poultry and game	64
Eggs	50
Beef and veal	46
Mutton and lamb	43
Apples	38
Cereals other than wheat	28
Cheese	22
Condensed milk	21
Fruit and nuts other than apples and bananas	19
Wheat flour	18
Bacon	14
Butter	13
Sugar	6
Bananas	0
Cocoa	0
Vegetable lard	0

The importance of the three factors, location, fertility and diversification, will alter with changing conditions. A fall in the costs of transport will tend to reduce the importance of the attraction of the market, and lead to a greater scatter of production. Thus the development of ocean and rail transport after 1850 resulted in the opening up of the American wheat areas, and the

¹ Since this date, even before the war, special assistance to agriculture and the limitations of imports increased the percentage for a number of products, notably sugar, wheat, bacon and condensed milk. Since the war the further stimulus to most forms of home production and the drastic cut in imports have changed the percentages still more.

introduction of cold storage encouraged meat production in Argentina and Australasia. For both products the percentage of British supplies provided by the home farmer fell, for wheat enormously. A rise in the demand for food products in the town will both intensify production and push it further out, another change which has occurred in the areas supplying this country in the last century. The discovery of new techniques of production may affect the intensity of production which is most profitable on all soils or on some soils, and may encourage or discourage diversification.

Agricultural production will have to adapt itself to these changes. It will not, of course, do so instantaneously, so that production at any moment will be partially adapted to conditions which have disappeared. Adjustment may be hindered partly because the farmers are slow to realize the changes which have come about, and the legal relationship between landlord and tenant slow to alter. Partly, however, it will not pay farmers to readjust their outputs until their buildings and machinery, designed for one sort of production, need replacement. Thus the location of agriculture at any one time depends partly upon the conditions prevailing at the moment, and partly upon those which prevailed in the past.

CHAPTER IV

THE SIZE OF FARMS

§ 1. *The Size of the Operating Unit.* The preceding chapter began with the assumption that each family constitutes one producing unit in agriculture, an assumption which, in a great part of the world, would be in accordance with the facts. The predominance of the family farm in many countries, and the generally small size of farming, need explanation, since it is open to the farmer, as it is to the industrialist, to hire workers as well as additional land and capital, and so increase the output that he controls. Unless a person prefers to work on his own account, he will be prepared to sell his labour in return for wages provided they are greater than the income he could obtain by working on his own. If the costs of production are lower when each unit is big, then the large producer will be able to offer higher wages than the income a small entrepreneur could obtain by himself. This is the position in industry, but not, to any considerable extent, in agriculture. Agriculture differs from industry in the predominance of small-scale undertakings, employing only a few or no hired workers, and this difference will be shown in the chapters that follow to be of profound importance.

Before going on to discuss the advantages and disadvantages of large-scale farming it is necessary to be clear as to what we mean by the size of a farm undertaking. An operating unit may be defined as a

business undertaking under one manager, but this is not an entirely unambiguous definition. Sometimes one manager controls two or more separate farms, occasionally in different parts of the country. For some purposes these farms should clearly be regarded as separate units; for other purposes, however, they may be looked upon as one.

There is no one method of measuring the scale of operation of an agricultural business and comparing it with that of other businesses. Farming statistics customarily classify the size of farms according to the number of acres they comprise; this is not an altogether satisfactory way even of comparing the size of different farms, since it takes no account of the intensities of production in different forms of farming; thus a 50-acre intensive vegetable holding is a very different affair from 50 acres of grazing land. It is wholly misleading as a basis of comparison between agriculture and industry, as it would indicate that operating units were larger in agriculture than in industry, which is clearly not a reasonable result.

The best measure of size to use depends upon the purpose for which the measurement is required. The arguments developed in subsequent chapters will require two indices, the number of workers on each farm, and the value of the output per farm. By both these standards, the size of the average agricultural business is very much smaller than that of the average industrial undertaking. In Great Britain the average number of workers per industrial firm before the war was 29, compared with about 4 in agriculture, including the farmer, while the value of average gross output per firm in industry is about 13 times that in agriculture.

Of course these averages conceal wide differences for individual undertakings, and many non-agricultural undertakings, such as retail shops, must average as few workers, though usually not such low gross sales, as does agriculture. Broadly speaking, however, the distinction is both important and true.

§ 2. *Advantages of Large Farms.* In agriculture, as in industry, there are some advantages in large scale production. They may be divided into two categories, marketing economies, obtained by buying and selling on a large scale, and technical economies, derived from a more economical operation of the farm.

Marketing economies may result either from an actual reduction in the costs of buying or selling as the scale of operations increases, or from a relative improvement in the farmers' bargaining power. It is clear that merchants who deal with farmers are involved in greater costs, and usually make higher charges, if, for instance, they have to sell 4 tons of fertilizer to 10 men rather than to 1 man; their book-keeping expenses will be increased, they will probably have to deliver over a wider area and at different times, while some of the product will be wasted in the process of dividing it up. Similar additional expenses will be incurred if small quantities are bought from each producer. These differences, however, are only important as between very small and medium transactions. In England, if an enterprise employing no more than family labour is prepared to buy its annual requirements in one or two lots, it is generally able to obtain the maximum discounts granted by firms selling feedingstuffs or fertilizers. On the selling side

it cannot bulk its sales if its product is perishable, so that it may obtain a lower price owing to higher transport and selling expenses ; but this difference is not generally very large. There is, however, one further advantage of large sales ; the farmer can sort his produce into grades, and hence, in normal conditions generally obtain a higher average price.¹

The advantages of large scale transactions lie at least as much in the better bargaining power which they confer. In a country where production is scattered, the small producer is likely to be very dependent upon the merchants who sell to him and buy from him, while a large scale agricultural enterprise can, if necessary, establish buying and selling organizations of its own. Small producers can place themselves, in this respect, upon an equality with large farmers, if they are prepared to co-operate in buying their raw materials and selling their product, a possibility which will be discussed further in Chapter V. It is enough to notice here that large scale undertakings only gain a substantial advantage over small in buying and selling when the small have to deal with monopolistic middlemen and are prevented, by their distance from other producers and from their markets, or by their unwillingness or inertia, from developing co-operative buying and selling.

The technical advantages of large scale farms are more numerous. First, farm buildings should represent a smaller relative expense as the size of the farm increases. The costs of building sheds to accommodate four times as many livestock, and barns to hold four times as much grain, are considerably less than four

¹ See p. 78.

times as much as the costs of the smaller buildings. In order, for instance, to increase the floor space by four only the floor and roof need to be four times as big ; the walls will only be doubled in area, since their height need not be altered. This economy is greatest for types of farming such as indoor pig feeding and indoor milking, where buildings are important.

Secondly, large farms can operate specialized and expensive machinery more continuously. This is the advantage which, generally above all others, is decisive in causing industrial undertakings to be large. Blast furnaces in the iron and steel industry, moving belts for assembling different parts in the motor industry, and many other types of machine, can only be used if assisted by a large number of men. In agriculture this type of machinery is non-existent. We have already discussed the reasons why each man in agriculture has to work on a relatively large acreage. For such dispersed work machinery requiring the continuous assistance of many men is clearly out of the question, as it would involve an intensity of production on any acre of land which would be quite uneconomical. Nevertheless, there are some agricultural machines which can only be used if several men are available to work them. A threshing machine needs a crew of 7 or 8 men ; a combine harvester requires one man to drive the tractor, another the combine, and one to remove the threshed corn, or three in all. Yet, even here, these men are not required throughout the year, and it is possible to hire some of them temporarily. Thus, if all operations on a farm were equally mechanized, it would not be certain that the introduction of machines would increase the most profitable number of men on

each farm, though it would undoubtedly raise the most profitable number of acres. It does not pay to buy an expensive machine such as a combine harvester unless this can be fully employed in the harvesting season, and such an implement can cut about twice as large an acreage as a horse driven mower.

In almost all cases, moreover, the introduction of machinery will increase the most profitable scale of farms, if this scale be measured by the output of the farm. It is true that mechanical cultivation may result in a somewhat smaller yield per acre than hand cultivation, though this is by no means certain. Machines cannot weed or pick as accurately as hand labour; but, since machine processes are cheaper, it will sometimes pay to perform more operations on the crop than if hand labour only were available. Even, however, if the yield per acre is decreased, this decline will certainly be more than compensated for by the larger acreage which must be included in each farm in order to make full use of the machine.

Although it is not certain that mechanization will increase the most profitable scale of farming when this scale is measured by the number of men employed per farm, it is very likely to do so on diversified farms. Not all operations can be equally mechanized; thus it has proved more difficult to devise ways of cultivating and harvesting roots by machine than it has with corn, while most of the tasks of animal husbandry must still be performed by hand. As a result, if a farm is to take advantage both of the most modern machinery available for corn, which necessitates a large acreage, and of the economies of diversified farming, it will need to hire more labour to cultivate

that part of the acreage which, in any year, is not under the crop whose cultivation is most mechanized. To take an extreme example, let us suppose that a third of the acreage on a farm is under corn in each year, and that three men are working on the farm, of whom one is needed for the corn. The invention of a new harvester may necessitate a doubling of the corn acreage for its economical use, while no changes are made in the other operations. Then, if the corn acreage is to remain as a third of the total, and if one man can now cultivate this increased acreage, it will be necessary to take on two additional men for the other operations. Thus the mechanization of farming has often tended to increase the most profitable size of farm. But it has not necessitated really large farms.

A third advantage of large farms lies in the opportunity they give to reduce labour costs by putting each worker to the task to which he is most suited, and so take the maximum advantage both of natural aptitudes and of that acquired skill and speed which comes from constantly performing the same operation. The scope for economies through acquiring skill is, once again, generally smaller than in industry. There are few operations in agriculture which must be repeated for all of every day, so that a man has no opportunity of concentrating on one small motion. A farm worker can only plough, harrow, and harvest the crops at the right seasons of the year, and must be able to perform all these operations. Cows must be milked twice each day, and pigs fed; but the stockman cannot spend all his time on these tasks, and must perform others as well.

Natural aptitudes for different types of manual work, on the other hand, are almost certainly as important in agriculture as in industry. Some men are exceptionally good at looking after animals, and will be more valuable on a larger farm where they can specialize as shepherds or cowherds than on a small farm where they must spend part of their time working on the arable land. Aptitudes differ, moreover, not only as regards different kinds of manual work, but also as between manual work and the work of managing a business. Some men are far better than others at organizing production, at supervising the work of subordinates and at making the necessary decisions as to what to produce and how to sell it. One of the important advantages which large-scale industry has over small is that it can take full advantage of the special skill of such men, allow them to spend their whole time in settling the major problems of policy, and delegate to others not only all manual work but also the minor supervisory work.

Occasionally this complete division of labour can be brought about in agriculture. If production is being carried on in a country where weather conditions are not liable to sudden change and are known in advance, and if production is specialized on one crop, it may be possible to delegate the immediate task of supervising the workers to foremen or overseers. In variable climates, however, and where mixed farming is the rule, it will be extremely difficult to reduce production to a routine, since the work to be done will vary from field to field, and alter as the weather changes. For this reason such farming generally involves a number of detailed decisions, which must be made rapidly

and cannot be easily delegated to anyone other than the farmer himself.

§ 3. *Advantages of Small Farms.* Beyond a certain size, the difficulties of supervision decrease the efficiency of a large farm, and tend to encourage small ones. It is impossible for the farmer to supervise the work of a large number of men, partly because he himself has to make so many detailed decisions. There is another reason, also, tending to make management less effective in agriculture as the number of men employed increases beyond a small number. The workers are spread over a very much wider area than in industry, so that it is impossible for any one man to control a number of them. The area worked by 10 men on an ordinary mixed farm in England would cover not much less than a square mile, and on a wheat farm in the Middle West of America about $2\frac{1}{2}$ square miles, a dispersion which clearly impedes an undertaking employing a large number of men.

Thus it is generally necessary to have a supervisor available for a small number of workers. The farmer or his delegate, however, may not have to exercise his managerial functions the whole time. For certain periods of the day the workers may be able to continue without his instructions, if weather conditions remain unchanged. He will then be able to do some of the ordinary manual work on the farm, while remaining accessible should any sudden modification of the work have to be arranged. Thus it is not always economical in farming fully to divide up the functions of management and labour.

Moreover, there are some advantages in not dividing

up these functions at all. The efficiency of the farm depends very considerably upon the skill of the worker and upon his attention to detail. Constant care is needed and is difficult to obtain unless the worker is financially interested in the result, while it is impossible to pay workers mainly by results in an occupation where the tasks are so varied and where only a few can be reduced to routine. There are thus definite advantages if the farmer himself, whose income is dependent upon it, performs a large part of the work. For this reason, some small farms achieve costs as low as, or lower than, larger farms, in spite of their inability to obtain the very real economies which, as we have seen, exist on fairly large farms.

On the whole, therefore, the advantages of large-scale operation are much less in agriculture than in industry. The greatest of them in industry, the scope given for using more complicated but more economical machines, is much less important in agriculture. On the other hand, the greater difficulties of management as the size of the business is increased become important at a far smaller scale in agriculture than in industry. Moreover, since these difficulties limit the economies open to skilful large-scale management they tend to drive the most talented business men from agriculture into industry, which gives them greater scope. Men of lesser aptitude for large-scale organization are thus left in agriculture, which is a further factor tending to reduce the most efficient size of farm. Where a man of unusual ability becomes a farmer he will usually have acquired a farm far larger than the average before he retires, but experience has shown that his successor is rarely, if

ever, able to manage successfully a farm of such a size.

§ 4. *Variations in the Optimum Size.* The most advantageous size will not be the same under all circumstances and in all branches of the agricultural industry. First, the more difficult it is for small farms to obtain cheap supplies and to market their products the greater will be the advantage of large-sized units. Secondly, if there exist efficient machines which need a number of men to work them, as in grain harvesting, the more will large farms predominate. Thirdly, the greater the economies of mixed farming the larger will farms have to be if they are also to obtain the full advantages of specialization of skill and of machinery. Fourthly, the more intensive is farming per acre, the easier will it be for a farmer to keep an eye on a number of men, and thus the larger will tend to be the labour force on a farm, though the smaller the acreage. Frequently, however, this condition, favouring many men on an intensive farm, will be outweighed by another; the more detailed the supervision required, and the more important is detail, the smaller should the farm be; very frequently intensive farming is less a matter of routine than extensive. Finally, the greater is the difference in managerial skill between masters and men the larger will be the most economical farm. Thus, if the available man power consists of two distinct grades, one, cheap, numerous and unskilled and the other small in number and with considerably greater aptitude for management, it will almost certainly be better to devote the whole time of the latter to management, even though they must consequently

spend a considerable part of it in transit from one group of workers to another.

The largest-sized farms, whether size be measured by number of workers or value of output, are mostly found in the plantation areas, where many of the conditions favouring large farms occur together. The products produced in plantations, such as tea, coffee, cotton and sugar, are sold in distant markets, and are suited for specialized production, while plantations are only established where there is available native labour as well as colonists or overseers more practised in executive work. Recent investigation, however, has thrown doubt on whether plantation production is always more efficient than small scale cultivation; for rubber the contrary appears to be true. In England the largest farms are usually those where mechanized corn-growing is combined with diversified farming.

§ 5. *Technical Hindrances to Expansion.* We have seen that the most efficient size of farm from the technical point of view is relatively small; but it is not as small as are existing farms in most of the long-developed countries. Calculations as to the best size of farm under existing conditions have generally been made on the basis of acreage rather than of number of men employed, and it has been estimated that in England general mixed farming could probably be carried on most cheaply in farms averaging somewhere between 500 and 1000 acres. Actually, the average size of farms is less than 100 acres, and only about a fifth of the number of farms, containing a little over half the agricultural land, are over 150 acres in size. This very wide discrepancy is due partly to technical and

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financial factors which limit the expansion of existing farms, and partly to social conditions which tend in a number of countries to make farms small.

There are three chief technical obstacles to the expansion of existing farms. First, the farm buildings will be adapted to the size of the existing farm, and it will be impossible to obtain the economies per unit of product which would have resulted had large, rather than small, buildings been put up in the first place. It is rarely cheaper to increase the size of sheds by adding to ones already existing than to build new ones; not infrequently it is more expensive. Thus, even in an undeveloped country where the farmer could take on more land on which there were no buildings, one of the advantages, though a minor one, of larger-scale farming would be lost. In an old country a farmer wishing to expand would most probably have to take on land already equipped with buildings, fences and roads, all adapted in position to farms organized as separate units. In that case, the costs of running the two farms as one unit from one centre rather than as two would be increased by the capital costs of extending the farm buildings on one of the farms and altering the roads. If the farmer continued to use both farm buildings this additional cost would be avoided, but the difficulties of management would be somewhat increased.

This obstacle to expansion is closely associated, in a fully settled country, with a second. Technical conditions may so have changed as to make most economical a size of farm larger than existing farms, but not twice as large. It will not be easy for a farmer to obtain the desirable increase in his land, since farms

are partly indivisible units, whose layout must be entirely revised if they are to be divided up. Moreover, unless a number of neighbouring farmers agree to split up one existing farm between them, expansion which involves taking over less than an additional farm is almost impossible.

A third check on expansion will exist if a farmer cannot acquire any land contiguous with his existing farm. This may often happen, since farms are only available when their existing owners give them up, and this does not happen frequently. In this country, in the early 1940's, the average period since holdings had last changed hands was 22 years. If a farmer wishes to increase his business he must take on what land he can get, and, if this land is not contiguous with his existing farm, he will obtain only those benefits of large-scale operation associated with economy of managerial skill, and perhaps a part of those dependent upon buying and selling in large quantities and using machinery to its full capacity. He will only obtain the latter advantages if he incurs some additional costs in moving the machines from area to area. The other advantages will not be open to him.

Thus an increase in the most economical size of farm will not necessarily justify more than a very slow expansion in the scale of farming in a fully settled country. Mechanization of farming may have raised the size of farm which could be most cheaply run, but the actual size lags behind.

§ 6. *Agricultural Credit.* The size of the farming business is sometimes limited, besides, by the difficulty

of obtaining capital. It is necessary for farmers, just as it is for other entrepreneurs, to incur expenses in producing goods in advance of receiving payments for the finished products. That is to say, farming requires capital. In fact a greater amount of capital is required in England per worker in agriculture than per worker in industry. It has been estimated that the average capital used per worker in 1928-30 was £1370 in agriculture, of which about three-quarters represented the value of the land, buildings and long period capital investment, as compared with only £430 in industry.

The expenses which must be incurred in advance can be divided roughly into two categories, long-period capital, used to acquire agents of production which help in the productive process over a long period of time, and short-period capital, used to assist in the production of one batch of goods alone. For some purposes it is desirable to subdivide long-period capital into the long and intermediate periods, corresponding to the long-period capital which is and which is not almost inextricably tied to the land, and to those types of long-period capital which, in England, are included respectively in landlord's and tenant's capital.¹

From the point of view of the individual farmer or landowner, the most important agent of production for which a price must be paid before production takes place is the land on which the farm is situated. It is true that, for society as a whole, land, when defined as "the original and indestructible powers of the the soil" is not on the same footing as capital, since,

¹ See pp. 67-8.

unlike capital goods, no productive forces have to be diverted from other uses to produce it. Once land is owned by anyone, however, the owner can put a price on it, and thus, from the point of view of the individual, it becomes on much the same footing as other capital goods.

Land is, of course, a long-period capital good. So is the work which must be done to that land in the way of clearing trees, drainage, fencing, and so on, which, once performed, is inextricably tied up with the land itself. So are the farm buildings and the machinery which is required in production, and the breeding and milking stock.

Short-period capital is mostly required for hiring labour, for buying seeds and fertilizers and young live-stock, and for holding stocks of the finished product until they can be sold. There is, however, no clear dividing line between long- and short-period capital. Some of the labour used in cultivating a crop and some of the fertilizer applied to it, which are classified as short-period capital goods, will benefit the succeeding crops, and so come into our category of long-period capital goods. Moreover, the milking cows and breeding sows, which we have put into the long-period category, are ultimately slaughtered for sale, and so come into the same category as seeds, which we have classified as short-period capital.

There is one type of expenditure in advance of the receipts for the products which we have not so far mentioned, the costs of living of the farmer and his family. These must be paid throughout the process of establishing a farm and producing the first product, and cannot easily be classified into the two categories.

A hard-and-fast distinction between the two types is not, however, necessary for our purpose.

Either the farmer must himself have resources to bridge the gap between expenditure and receipts or he must borrow from those who have. In general his own resources will be limited and, if he must depend upon them the scale of farming at which he can operate will be correspondingly restricted. It is therefore necessary to consider the extent to which he can borrow from others the capital necessary to operate a farm on the most economical scale. This is the problem of agricultural credit.

Obviously the amount of capital which he can use is not fixed. It is open to him to employ methods which require a greater or less lag between expenditure and receipts, since the more machinery he uses in production and the greater the extent to which he improves the soil, the more capital he will need. Now the total amount of capital available for industry and agriculture is limited by the size of the national income and by the competing demands upon it for immediate consumption and to satisfy communal needs; agriculture must compete with industry for the available supply. If the supply of capital to either occupation is equally well organized, the rate of interest charged to each for borrowing will vary only according to the different risks in the two occupations. If there is a greater chance in agriculture than in industry that the capital borrowed will not be repaid, then it is reasonable that the rate of interest charged should include a premium to compensate lenders for this risk. Probably such an additional possibility of loss does exist. It is more difficult to find out the

degree of risk in an occupation such as farming, where the units are small, than about industries where they are large, so that it is more risky to lend to such an industry. Moreover, as we shall see later, agriculture has been subject to a chronic depression relatively to industry and to considerable variations in the price of its products and in the profits obtained from them.

While it is, in a sense, true to say that the size of farms is limited because farmers cannot obtain as much capital as they would like, at as low a price as they would wish, this statement has little meaning, since the shortage of all resources is one of the fundamental facts which cannot be avoided. Far more meaning would be attached to the phrase "a shortage of capital" if it could be shown that farmers could not obtain as much as they wanted at a rate of interest which only differed from the rate charged in industry by a reasonable allowance for the difference in risks. Opinions differ as to how far this is true.

The methods by which agriculture obtains its credit are, generally, very different from those open to industry, both for long- and short-term capital. In order to obtain its long-term capital, a large-scale undertaking, in a fully developed country, can form itself into a limited liability company, can inform the public of its probable profits and can borrow through the well-developed mechanism of the issuing houses, which sell shares in the business to the general public. In a primarily agricultural country it may have to borrow abroad, as there is frequently no organization for mobilizing the peasants' savings. Neither of these methods are open to small-scale undertakings, and they are therefore closed to most farmers. For this

there are two main reasons. First, the process of issuing shares is expensive unless the capital concerned is large; secondly, it is impossible for the general public to form any idea of the prospects of a small concern, and not worth while for the professional investor or adviser in financial matters to bother about such a small matter. Agriculture, like other small undertakings, has to turn elsewhere for its long-term capital.

The sources it relies upon depend to a large extent upon the system of land tenure in operation. A great many farmers themselves own the land upon which they work; in Great Britain about a third of the agricultural land is now farmed by owner-occupiers, and in many other countries a greater proportion, in New Zealand very nearly half, and in Denmark so much as 95 per cent. Such farmers must themselves provide the capital to buy their land, introduce the necessary improvements and construct the required buildings, or must borrow it from others. Since the land and buildings can be pledged as securities to the lender in case the borrower fails to repay the loan, it is usually not difficult in a capitalist developed country to borrow money on mortgage from private investors, investment companies, etc., up to a fairly high proportion of the value of the land. It is almost invariable, however, for the farmer himself to have to find a part of the necessary capital, as the condition of the land and buildings depends upon the way he farms as well as upon the general prosperity of farming, and as, if the lender has to foreclose on the land and buildings, he will, at the least, be involved in considerable trouble in finding another tenant. Thus the would-be farmer

must own some capital. The other chief difference between this method and that employed in industry is that the mortgage carries a fixed rate of interest, while the share commands a part of the profits of the business, so that the farmer cannot transfer so much of his risk to others as can the manager of an industry. This is an important distinction, since the financial difficulties of farmers during periods of generally falling prices are greatly increased by the necessity of paying a fixed money rate of interest on their mortgages.

When farmers do not themselves own the land, but rent it, then the problem of long-term capital to obtain land is inevitably shifted from them to the land owner. In practice it is also necessary for the landlord to provide much of the long-term capital needed for drainage, fencing, buildings, etc., since such investment, once made, is practically inextricably tied up with the so-called "original and indestructible powers of the soil." The landlord may use his own capital for this purpose or, if it is not adequate, may borrow a large part of it on mortgage, just as does the owner-occupier. Thus, although the man who owns the land he farms may find the proportion of long-term capital which he must provide himself a check to the expansion of his farm, this will not be true of the tenant farmer, so far as this part of long-term capital—landlord's capital as it is called—is concerned. He will, in effect, borrow from his landlord the long-term capital needed in his business, and will pay interest on it in the form of an enhanced rent. Often he will obtain the capital for less than the market rate of interest, since land owners not infrequently retain or buy land for the social prestige or the satisfaction of ownership that it gives

them, and provide what they regard as the necessary improvements almost irrespective of the financial return. There is little doubt that this was the case in England before 1914, though there are no adequate statistics to show it.

Not all long-term credit, however, is provided by these means. The owner-occupier cannot borrow on mortgage in order to finance his purchases of machinery and livestock, which are types of capital equipment similar to those paid for, in industry, largely out of share capital, but must depend upon the same sources as he does for his short-term capital. When a farmer rents his land, the landlord occasionally provides the intermediate and short-term as well as the long-term capital. If he does so he will, inevitably, bear a considerable part of the risk of the business, and will not be able to spread this risk over many borrowers, since he will lend only to his own tenants. He will, therefore, usually wish to exercise some control over the farmer's operations and to share in his financial returns. For this reason the landlord rarely provides intermediate and short-term capital unless the system of land tenure is one which gives him this position, as does *métayage* in some parts of Europe, or share cropping in parts of the Southern United States. Just as in the case of long-term credit, the landlord, if he is responsible for short-term credit and if his own resources are inadequate, can borrow from the same sources as does the owner-occupier.

Under systems of land tenure, such as that in England, where as much as possible of the control of farming operations is left in the farmer's hands, the farmer is himself responsible for obtaining his inter-

mediate and short-term capital. The division of responsibility between landlord and tenant produces problems of its own. The landlord needs protection for his property. In fact only some of the powers of the soil are "original," and a very great deal is not "indestructible," as is shown by the serious loss of fertility by erosion in many parts of the world. Long period investment can also be damaged by bad farming. The tenant needs security of tenure if he is to retain his home and build up the value of his business. In this country many laws have been passed designed to regulate the respective rights and duties of each partner. From the early Agricultural Holdings Acts in the last quarter of the nineteenth century to the Agriculture Act of 1947 more and more emphasis has been laid on the rights of the tenants. We cannot deal here with these successive changes.

For short-term capital, even more than for long, the individual farmer finds borrowing more difficult than does the individual industrialist, who can rely mainly upon the banks. This source, of course, is also available to farmers, though less easily than to industrialists, since the small scale of operation makes it more difficult for the banker to ascertain the creditworthiness of the farmer, especially if, as is too frequently the case, the farmer keeps no adequate accounts. There are, also, other disadvantages from the banker's point of view in loans to farmers. First, banks, particularly in England, prefer to lend only for a few months, while the period of production for which short-term capital is required in agriculture is usually at least a year for crops, and considerably more for livestock grown for slaughter. Secondly,

agricultural products are less standardized and more liable to sudden damage by the weather than are industrial. Thirdly, there are sometimes difficulties in the way of providing security for loans by claims on the livestock or the standing crops.

Some of these disadvantages are avoided if a number of farmers are prepared to join together to pledge their joint credit to the banks by means of a co-operative association. The work of ascertaining whether a particular loan is justified is then transferred from the bank manager to the farmers managing the co-operative association, who will be neighbours of the would-be borrower, and familiar with his business. Such associations, moreover, can themselves borrow from their members and from the public, as they are in a position to spread the risk of loss on any individual loan, and can therefore provide a source of credit where banking facilities are inadequate, or for loans of too great a length to appeal to banks. In a number of countries such co-operative associations or people's banks have, in the main, solved the problem of intermediate and short-term credit to farmers. In England, however, and in most of the Anglo-Saxon countries, the farmer has been unwilling to allow his neighbours to inspect his affairs, and co-operative credit associations have failed.

In this country the farmer obtains a large part of his short-term credit from the dealers from whom he buys his materials or to whom he sells his product, a method which has some advantages. In so far as the farmer delays payment for his seeds or his fertilizers or his feedingstuffs until he has sold the products they help him to grow, he obtains credit for exactly the

time for which he needs it. Moreover, the dealer is in a particularly good position to know the farmer's credit-worthiness. But there are also disadvantages. The dealer, too frequently, charges no specified rate of interest, but adds the costs of lending to the price of the product, so that not only do borrowers not know what price they are paying for their credit, but also those who pay cash pay the same price as those who borrow. In addition, the farmer loses his freedom to buy or sell wherever he wishes, so long as he remains in debt.

Thus most farmers have themselves to provide some of their intermediate and short-term capital, or rely upon the expensive method of borrowing from dealers. In addition, almost all farmers who own their own land have to supply a part at least of their long-time capital. It is thus generally true that farmers cannot expand their businesses unless they possess some capital of their own, and that, consequently, any increase in the size of farms is hindered by the fact that many farmers have no spare capital. In other words, because a farm must for technical reasons be organized mainly on a small scale, it is faced with difficulties in obtaining credit which tend to make it even smaller than would be technically desirable.

§ 7. *Social and Legal Considerations.* The size of farms is not, in actual fact, determined wholly, or often even mainly, by the economic considerations which we have discussed. It is also profoundly affected by social and legal factors, particularly by the laws and customs relating to inheritance, and by the prevailing attitude towards the ownership and maintenance of land.

In some countries, such as France, a father is compelled by law to divide his property, including his landed property, at death between his children, and in many other countries he tends to do so. Except where the system of primogeniture is the rule, there is therefore a tendency for farms to be reduced in size whenever the owner, if he be an owner-occupier, dies. In such cases it is open to the heirs to amalgamate their holdings and run them as one unit, or for some of the heirs to sell out to one who remains on the land ; but there are difficulties in both courses. Joint management is not likely to be very satisfactory, and it may be difficult for one of the heirs to raise enough capital to buy out the others. Moreover, even though the land be left to the eldest son, some of the farmer's wealth will commonly be divided among the other children, which may easily leave the farm short of capital and may even necessitate the sale of some land to provide enough capital to work the remainder. Finally, if death duties are levied, the capital will again be depleted.

If a landlord dies, the division of his property or the payment of death duties may also result in a depletion of his tenants' capital, and consequently tend to reduce the size of farms. It is by no means uncommon in England for farmers to be faced, on the death of their landlord, with the alternatives of buying their land or leaving their farms, and to choose the first alternative even though they own too small an amount of capital both to buy the land and to stock their farms adequately.

A further important social consideration affecting the size of farms is that many persons desire to own

land, not in order to increase their income, but for the social prestige or sense of security and pride of ownership which it gives them. We have already seen how such an attitude on the part of a landowner may result in cheap long-term capital for agriculture. On the part of a farmer, however, it tends to reduce the size of farms, since, if he cannot raise enough capital to own a farm of the most economical size, he will often be prepared to obtain a lower income on a smaller farm which he owns himself rather than to rent a larger farm. Such action is not necessarily uneconomic, since the farmer may deliberately prefer the satisfaction provided by landownership to that provided by a higher money income. By raising the price of land, however, it prevents large holdings from coming into being, and is probably the most important factor tending to keep farms small in the peasant countries. The farmer may obtain a smaller income than he could as a tenant or even as a farm labourer working for another, but he will feel greater security, and a definite pride in ownership.

CHAPTER V

MARKETING

§ 1. *The Self-sufficing Farm.* So far we have dealt almost entirely with the production of agricultural commodities on the farm. Part of this output is used to satisfy the needs of those who produce it. In backward countries, and in those with a sparse population, farmers produce far more for their own use or for part payment of wages than for sale, while even in countries like England and the United States a proportion, though a surprisingly small one, of farm output is consumed at home.

A survey in the Eastern counties of England before the war showed that the amount of food produced by farmers and used in their own households varied only from 6 per cent of their gross output on small farms of from 20 to 50 acres down to 1 per cent on large farms of over 500 acres. The proportion of wages paid to farm workers in kind was also small, approximately 7 per cent of the total. In the United States the value of food produced and consumed on the farm, though higher than in England, then averaged only 9 per cent of total farm receipts, and the value of food paid in kind to agricultural workers only $12\frac{1}{2}$ per cent of their cash wages.

In addition to this, a certain amount of food, particularly of vegetables and eggs, is produced in gardens or allotments by persons mainly employed on other tasks. In England and Wales, for instance, it was estimated

that before the war about a quarter of the egg production and about one-eighth of the potato output were grown in gardens, allotments and backyards. Some of this was sold, but the greater part was consumed by those who produced it. For other commodities, however, the proportion of the output not entering the market was far smaller.

Even where the product is consumed on the farms where it is grown, some services additional to the ordinary ones of agricultural production must be performed in order to make the goods available to satisfy the demands of the farmer and his family. As we shall see, they can frequently be rendered more cheaply by a large-scale organization than by a small, which is one of the reasons why farmers do not consume themselves a larger part of their own output.

§ 2. *Market Demand.* Since the greater part of farm output in many countries is not consumed by the people who produce it, it must, like industrial products, be sold to satisfy the consumers' demand. These consumers earn money incomes by producing some other commodity, are free in normal times to spend this money as they like, and distribute it among a number of goods and services so as to obtain the greatest satisfaction they can from it.

Agriculture, as we have seen,¹ is mainly concerned in producing food, so that consumers' demand for agricultural products is largely a demand for food. That means that it is a demand for a fairly regular quantity throughout the year, three or four times a day, by every family in a country except those who grow their

¹ See p. 8.

own food. It is greatest and most concentrated in the towns, but it exists also in the country districts. It is for many varieties, supplied in small quantities, and frequently in different forms from those in which the farmers produced them.

The output of food, as produced by the farmer, is not able to satisfy this demand directly, since it is partly seasonal, partly perishable, and is grown by farmers scattered over the rural areas of the world, often far distant from towns. Moreover, it is produced in amounts which the farmer can only partially control and of types and qualities which may also vary irrespective of his intentions.

Thus farm output is generally produced neither at the time, nor in the place, nor in the form in which consumers require it. Since the object of all production is to satisfy consumers' demands, agricultural output is useless until these maladjustments have been corrected, and supply and demand been brought into relation with one another. Someone must estimate where, when, and in what form consumers require agricultural products, and the quantities they will buy at various prices. Someone must also find how much of these products are available, and at what time, and must arrange to offer them, at the right time and in the required form, to those consumers who will pay the best price in relation to the costs of supplying them. This, again in normal times, is the function of the middlemen. They are the people who bring farmers' supply into relation with consumers' demand, collect a multitude of products from many producers, and disperse these products to many consumers. They also are the people who decide what prices are

necessary in order to adjust demand to supply. In its essence, the marketing process is the mechanism for fixing prices, just as a market is a place where buyers and sellers together arrive, by bargaining, at the current price. Yet, although this is the core of the marketing process, it is by no means the whole of it. Many important services must be rendered between producer and consumer before the two can be brought together.

There is, of course, a marketing problem for industrial as well as for agricultural products, and many of the services rendered by middlemen for agricultural products are also required for industrial. It is beyond the scope of this book to describe or analyse the marketing process in any detail.¹ We cannot, however, understand the economics of agriculture without some knowledge of the problems connected with marketing agricultural products. These problems are in many ways different from those of marketing industrial products, owing to the different conditions of demand and supply. Moreover, since farming is a small-scale organization, the middlemen who deal with farm products acquire an importance that they cannot obtain in industry.

§ 3. *Marketing Services.* Many services, as well as the general direction of distribution and the establishment of prices, must be rendered in the marketing process. Not all of them are required for all products, though most of them are necessary in providing food for a large city. First, the product must be collected from the producers' premises and assembled in bulk. This

¹ See D. H. Robertson, *The Control of Industry*, Chapter IV.

is necessary because, as we shall see, the subsequent marketing processes are most cheaply and effectively carried out on a large scale, whereas the typical farmer produces only a small output.

Secondly, the heterogeneous output produced must, generally, be sorted into grades, and, if possible, classified according to standards previously laid down. Consumers and producers can be brought together without this service, but usually not so effectively. Some housewives prefer only the highest quality produce, the most flawless apples, for instance, or meat from the best fattened cattle, while others willingly accept blemished apples or less high quality meat, if they can obtain it for a lower price. Both producer and consumer gain if these preferences can be met. Grading is desirable for all goods which are not produced to exact specifications, in uniform quality, so that raw materials other than agricultural, such as coal, may require it, but it is not necessary for industrial products which can be turned out uniformly similar to one another.

Thirdly, the raw material produced on the farms may often need processing or manufacturing. A part of this processing, that of plant products into livestock, is, as we have already seen, always performed on farms, and is included in agricultural production, and not in marketing. Some agricultural products need no further treatment ; thus milk is still often sold to the consumer untreated and unbottled, eggs as they come from the hens, and fruit and vegetables raw more often than tinned. Many, however, need additional processing. Thus wheat must be ground into flour, and the flour made into bread ; meat must be slaughtered at a

butcher's or an abattoir, and sometimes undergo further processing, as into bacon ; raw milk is often cooled, pasteurized and bottled, or made into butter, cheese or condensed milk ; fruit may be tinned or made into jam, and so on. Further, already-cooked foods, tarts, cakes, soups, etc., are now frequently bought by consumers.

The manufacture of industrial products is generally treated as a separate process, and not classified as one of the services performed in marketing raw materials. None the less, it is convenient and legitimate to group the manufacture of agricultural products with the other marketing functions, rather than to treat it as a separate stage in production. Industrial raw materials generally, though not invariably, lose their identity in manufacture, but this is unusual for farm products. Unlike industrial goods, agricultural products are rarely one raw material in a subsequent lengthy process of manufacture, nor can they generally be used in any or all of a number of products, serving very different uses to consumers. There are exceptions, but these are mostly among the few agricultural products which are not foodstuffs. Thus cotton or wool may be used for clothing, or the upholstery of cars, etc., and rubber has numerous industrial uses. Some foodstuffs, also, have alternative industrial uses ; thus skimmed milk was used to make umbrella handles.

The fourth service is that of storage. Consumers demand a regular supply of foodstuffs throughout the year, and production, even when supplies from different climates are dovetailed together, is irregular. Crops are usually harvested once a year, and even livestock products, such as milk and eggs, which can be produced

throughout the year, are supplied at lower cost in the spring than in the winter. Someone has to arrange for the storage of those products which are not perishable, so as to even out supplies. The easier and cheaper is storage, the more possible is it to produce products at the season when costs are lowest. This service is not confined to foodstuffs, but is more important for a product with a seasonal production than for one which can be produced regularly throughout the year with no increase in cost of production. Thus it is more necessary for agricultural than for industrial products.

The fifth service is that of transport from the place of assembly to that of final sale. The importance of the charge made for this service has already been emphasized in the chapter on the localization of agricultural production. The lower the transport costs per unit of weight, the more is it possible to take advantage of specially low costs of production in various districts.

Finally, the product must be sold to the consumer. This service, in its entirety, involves both offering products in a form in which the housewife can see them, so that she can choose between different commodities or different qualities at various prices, and transporting the purchases to the consumer's house. This, obviously, is a service which is required, in some form or other, for all goods. The sale of foodstuffs, however, is in some ways different from the sale of other goods, since it generally takes place in a number of rather regular small transactions. Consumption is far more constant than for other commodities, and purchases, very often, are made only just before consumption. For this there are three reasons: first, foodstuffs are

frequently perishable ; secondly, many consumers never have an appreciable margin between receipts and expenditure, so that they cannot buy in advance ; and thirdly, many houses are almost devoid of storage space.

The provision of these services also necessitates, throughout the marketing processes, two additional services, the provision of capital and the bearing of risk.

We have seen how the production of farm products requires capital, since the farmer must incur expenses before he receives anything from the sale of his product. Similarly, if the farmer is paid directly his output is ready for sale, there will be an interval before this payment is recovered from the consumer, and, in addition, during this interval, further costs will be incurred to pay for the other marketing services. Thus capital will be necessary to bridge the gap between payments and receipts, and the longer is the gap, the greater will be the necessary capital. If the product is produced annually and stored before sale, the time lag will clearly be longer than if, like liquid milk, it is generally sold immediately after production.

The marketing process also involves the bearing of risk. Prices may fluctuate, both from day to day, from month to month, and from place to place. The product may, unexpectedly, deteriorate in quality, so that only a part of it can be sold at the ordinary price, and it may be stolen, or destroyed in a fire. Someone must bear these risks between the time when the product leaves the farmer's hands and when it reaches the consumer's.

§ 4. *The Scale of Operation.* These services may be performed by one organization, or, more frequently, by a number, each specializing on a particular task. Thus firms build and operate plants for cold or gas storage, elevators for handling grain, warehouses at ports, etc., and let space in them to merchants who wish to store products. Railways, ships and motor lorries carry agricultural products at fixed charges. Banks lend short-term capital and issue houses organize the floating of shares to provide long-term capital to merchants. Finally, insurance companies assume the risks of loss from fire, shipwreck, accident, theft, etc., while speculators, working in organized produce exchanges, relieve producers of some of the risks associated with fluctuations in the price of the product. These operations are more akin to industrial than to agricultural activities, and, like many industrial processes, are most cheaply carried out by businesses which deal with a large volume of produce.

While a number of the marketing functions may be transferred to such specialist organizations, the central task of controlling and organizing distribution is not undertaken by them, but by merchants. There may be a chain of merchants between producer and consumer, or there may be only one.

The first stage of distribution consists of assembling the product from the farm to a place where supplies are bulked, and is performed by the farmer himself, or by fairly small dealers. Here, just as in farming itself, there are no overwhelming benefits to be derived from large-scale operation, so that the greater attention which the manager of a small business can pay to detail becomes important. The machinery required

for collection is not complicated, and there is no great scope for specialization of function.

None the less, there are some advantages in having the work performed by a specialist rather than by the farmer himself. Where there are sufficient farmers within a district to provide full-time occupation for a haulier in drawing their products to market, there are economies in employing one. Firstly, he will be able to use the lorry he needs for transportation more continuously than could one farmer, and so spread its cost over a larger number of units of product. Secondly, the farm labourers, who may have specialized skill in their usual tasks, will not have to spend part of their time driving a lorry, an occupation which may require different aptitudes and training.

These advantages, however, may be counter-balanced by others, which sometimes exist when the farmer himself distributes. He may require a lorry or motor in any case, either for work on the farm or for his own private use, and may be able to use it for taking goods to and from the market at times when it would otherwise be standing idle. If a haulier operates a lorry, its capital costs will be an addition to those which the farmer would anyhow incur, and not a substitute for them. Moreover, the farmer may be able to employ his own time or his workers' on transporting the goods to market at times of the day or week when there is little or no work to be done on the farm. Again, costs would be higher and not lower if a specialized dealer set up. If there is not enough work in one district for a full-time haulier the advantages of the work being done by the farmer are correspondingly greater. For these reasons the farmer

frequently transports his goods himself to the nearest market.

The last stage of distribution, that nearest to the consumer, is also usually organized on a small scale. Retail shops are often small for rather a different reason than are hauliers' businesses. Consumers frequently find it convenient to have shops of all varieties close to their houses, so that many small ones set up, even though larger units in a central position could operate at a lower average cost. Of course it is possible to combine small shops with large-scale management, as is done by such multiple stores as Sainsbury's, Marks and Spencer, Woolworth, etc. But, once again, the small shop can generally keep going in competition with large organizations.

The intermediate stage of distribution, that performed by the wholesale merchant, is, however, nearly always organized on a large scale. It is the wholesaler who plans where every product shall be sent, and what prices will equate demand and supply. He it is who performs, or arranges for specialist organizations to undertake, the remaining functions of marketing, grading, processing, storing, transporting, providing some of the credit and bearing the greater part of the risk. We have already noted that such industrial processes are most cheaply performed on a large scale. Moreover, the study of supplies and of market conditions, an essential function of wholesale merchants, is easier for a large than for a small firm. If any middle-man is to direct goods into the most profitable outlets, he must know what is happening in many places. This study must be made even for small transactions, if they are to be undertaken to the best advantage, but

once made, can serve as the basis for very large sales. Unless some organization steps in to provide market intelligence, some trade paper or Governmental agency, this will give a very substantial advantage to big firms.

Thus wholesale firms are nearly always large. Sometimes they find advantages in integrating their business either backwards to the producer or forward to the consumer, or in both directions. The advantages and disadvantages of specialization and integration cannot be discussed here. Either may have advantages under different circumstances.

§ 5. *The Costs of Marketing.* We have already pointed out that distribution is as necessary as production in providing consumers with food. Without the services we have described the division of labour between industrialists and agriculturists would be impossible, as everyone would have to grow their own food. It is, however, frequently suggested that the distribution of food costs too much. The distributor, undoubtedly, absorbs an alarming proportion of the amount the consumer pays, and more, often, for agricultural than for industrial goods. In England before the war the farmer generally received about three-quarters of what the consumer paid for his meat, about half for milk, and a very variable proportion, sometimes falling so low as a third or even less, for fruit and vegetables. The New Zealand farmer obtained between a half and four-fifths of what the English consumer paid for his butter. A very rough division of what the consumer paid for food in 1930 gave one-third to the farmer and the importer (this including transport from overseas to the British port), one-third

for the manufacture and processing of food, and one-third for distribution proper at a later stage. Prices of primary products were depressed in 1930 and earlier years would give a result more favourable to the farmer.

There are several reasons why distribution should be more expensive in agriculture than in industry. The small scale of agricultural production, the wide dispersion of producers, the variations, both in the quantity and quality of output, the perishability of the product, and the advantages to the consumer of buying in small quantities from a shop near his home all add to the costs of distributing farm goods. These difficulties generally outweigh the advantages given by the greater stability in the demand for food, which is a type of product less liable to fashion changes than are most others.

It is possible, none the less, that marketing services are not performed as cheaply as they could be. The justification for the persistence of a system of individual enterprise and freedom of individual choice, such as we have been describing, lies in the assumption that competition between different people insures that their services shall be performed at the lowest possible cost. If any service is unduly extravagant, it is assumed, some other person will be attracted to supply it more cheaply. It is now clearly recognized that this ideal arrangement is frequently prevented by obstructions of different types, and that competition, in fact, is far from perfect. Some of these imperfections are particularly noticeable in the marketing sphere.

Firstly, both for country dealing and for retailing, some degree of local monopoly is inevitable. Thus in

country dealing costs of transport will obviously be lowest if only one dealer visits each area. as the total distance travelled will thus be reduced to a minimum, by the elimination of overlapping. The same is true for retail distribution, where the shop delivers food-stuffs daily, or even twice daily for milk, to the consumer's house. Thus farmers and consumers are likely to have a limited choice of people to whom to sell or from whom to buy, and, in so far as there are several firms in each area, the costs of distribution of each will be above the minimum. Moreover, unless farmers and consumers devote a disproportionate amount of time and energy to the matter, they will not be able to find out what other dealers are paying or other shops charging, and thus will not transfer their business at all readily from firm to firm.

As a result, both dealers and retailers will have partial monopolies in their district, so that it may be to their advantage to raise their charges above what their costs would be if they were working at full capacity. Their monopoly, however, will not extend to preventing new firms from entering their business, so that the higher rate of profits resulting from the high charges will attract competitors, and the volume of business of each firm will be reduced until profits are no longer abnormal. There will then be more firms in the business than would be necessary to carry out the work if each were working at full capacity, and costs will be higher than they would be if each firm had a larger turnover. Nevertheless, it will not pay any firm to reduce its charges and attract more customers, for each firm will compete freely with others only at the edge of the area it serves, and any

reduction in charges made to attract such customers will have to be extended also to the customers least able to transfer to others. It is therefore possible, and likely, that the costs of country dealing and retailing will be above the minimum, even though none of the firms in these occupations earn excessive profits.

This type of imperfect competition is less likely to occur in wholesaling. There is no reason why any particular wholesale firm should deal with any particular group of customers, since usually most firms will be situated in the marketing centre, and will not transact business with special areas only. Moreover, the wholesale firm frequently deals with other traders, both in buying and selling, who are able to devote more attention than are either farmers or consumers to variations in the prices charged or offered.

Another form of imperfect competition is, however, quite likely to be found, since the most economical scale for wholesaling is large, and it is not unusual for the number of wholesalers in any branch of trading to be small. Sometimes, even, the best scale of operation is so large that only one wholesaler exists. Moreover, even when there are several, they usually find one centre to be the best place for their business, and so are likely to meet each other constantly. It is then probable that they may agree on the prices which it is most advantageous to their interests to offer or charge. In other words, they may act as a monopoly. They may even amalgamate into one organization, not in order to obtain economies of operation, but in order to be in a better bargaining position. Such an organization may succeed in preventing new firms from setting up, by threatening temporarily to lower its charges in

order to ruin new entrants. Thus wholesalers may be able permanently to earn excessive profits at the expense of producer and consumer. Their power will be particularly great because the persons with whom they have to deal are generally organized on a much smaller scale than are the wholesalers themselves. The danger in wholesaling, is, therefore, mainly excessive profits, while in retailing it is excessive costs. The same arguments apply to some manufacturing. Large scale organizations are then quite frequent, for instance in margarine manufacture, in sugar refining, in grain milling at the ports, and in many other lines.

One further defect in the marketing system must be noted—a failure which is difficult to attribute to any stage in the marketing process. Consumers' preferences for particular types of agricultural products, as shown by the relative prices they are prepared to pay for them, are often not fully reflected back to the producer in differences in the prices they receive for particular varieties. No really good reason can be given for this failure except that, where competition is inadequate, it is too much trouble for the merchant to arrange to pay by grade. There is thus a danger that farmers will grow the wrong types of goods, or will grow an undue number of varieties. In other words, the marketing system may not perform thoroughly one of its main duties, that of adjusting supply to demand.

There is very little doubt that the distribution of food costs more than it should. In England, the Linlithgow Committee, which studied the matter in detail in 1922-3, concluded that "the spread between producers' and consumers' prices is unjustifiably wide. Taken as a whole, distributive costs are a far heavier

burden than society will permanently consent to bear." Since then there does not appear to have been much improvement. The number of retailers is almost certainly redundant, particularly for milk, where it is not uncommon for so many as three or four roundsmen to visit the same street, once or twice in the day. There are undoubtedly so few wholesalers in a number of trades that the leading firms occupy a position of ascendancy. Thus Messrs. Spillers and Ranks in the milling trade, United Dairies in milk distribution, Marsh and Baxter in the bacon industry, control a very large proportion of the business, and earn profits which, though not large per unit of the product handled, are yet sufficiently great in the aggregate and in proportion to the capital invested to excite the envy and annoyance of the farmers in whose products they deal. How far the organizations became so large as a result of, or in order to attain greater efficiency, and how far in order to obtain greater power, it is difficult to say.

§ 6. *Co-operative Marketing.* One of the ways in which attempts have been made to lower the costs of distribution is through the co-operative marketing of products. Co-operation may be organized from either end of the marketing process. Producers may attempt to distribute their own products in the hopes of obtaining higher returns, or consumers may take over distribution in order to buy cheaper.

These two forms are not mutually exclusive. Producers' co-operatives, though they may attempt to control all the stages of distribution, will naturally start from the producers' end, and may assume no more than the functions of country dealers, or of

country dealers and wholesalers. Consumers' co-operatives will, equally naturally, start from the retail end, but may also reach backwards to the producer. There are examples of co-operative societies of all these types. Thus several organizations of milk producers in the United States have tried to distribute their own milk right to the consumer. The English Co-operative Societies, which are essentially retail organizations, work together with the Co-operative Wholesale Society, buy their own milk and occasionally other products from farms, and even operate a few farms of their own. Examples of such complete control of the process of distribution are, however, rather rare. Where farmers' co-operatives have attempted retail distribution they have rarely been effective; the American attempts to distribute milk to consumers have nearly all been abandoned. Consumers' co-operatives have been more successful in buying directly from the farmer, though not in organizing their own farms, but it is more common for them to buy at wholesale, or from producers' co-operatives. Thus the Co-operative Wholesale Society, organized from the consumers' end, buys butter and bacon from the farmers' co-operatives in Denmark, besides operating factories of its own there.

A discussion of consumer co-operation is beyond the scope of this book. Something, however, must be said about producers' co-operation. Its real achievements are apt to be lost sight of by persons who expect from it something which is altogether impossible. Too often it is suggested that the purpose of co-operation is "to eliminate the middleman." It is implied that they perform no useful function, and that farmers have only

to sell their own products in order to increase their profits by the amount absorbed between producer and consumer in the marketing process. The absurdity of this view is obvious. The middlemen, as we have seen, perform services which are just as necessary as the farmers' if our great city populations are to be fed. They cannot undertake these services without using the factors of production—land, labour, capital and management—that is to say, without incurring costs. If the farmers took over the distributive process they, equally, would either have to hire labour to work for them and borrow capital, or would have to give up the greater part of their time and use their own capital, thereby diminishing their efficiency as farmers.

It is clear that the real purpose of co-operation is not to eliminate the middleman, but to perform his services at a lower cost, and absorb any profits which he may obtain over and above those necessary to attract able organizers into the business of distribution. Its success will depend upon its capacity to remove the inefficiencies in the competitive system which we have already noted, without introducing other defects.

Undoubtedly co-operative marketing has some advantages. First, it can attract farmers to sell through it not only by returning them a higher price than its competitors, but also by calling into play their loyalty to an organization which they help to control. Thus it will probably find it easier to deal with a large number of farmers in each locality than can any private concern, and may, as a result, be able to reduce the costs of country dealing.

Secondly, even if a co-operative marketing organiza-

tion only takes over the functions of country dealers, it will improve the bargaining position of farmers, and make it possible for them to negotiate on an equal, or perhaps even a superior footing, with large-scale wholesalers. Thirdly, it may be able to offer to sell such wholesalers a more regular and assured supply than they could obtain if they had to compete with other wholesalers for the produce of many farmers. This would reduce their costs and enable them to offer producers higher prices. How far this advantage can be realized in practice it is difficult to say. Theoretically, members of a co-operative should deliver regularly to their association, and many do so, but others can often be attracted away by apparently better terms offered by private dealers.

These advantages should apply equally if the co-operative itself performed the wholesalers' functions. It could then obtain the advantages of really large-scale operation in wholesaling without the danger of the exploitation of the producer by monopolistic organizations working for their own profit.

Fourthly, the formation of a co-operative society frequently makes it easier to adjust producers' supply to demand. Co-operative associations are generally fully aware of the necessity of passing back consumers' price preferences to the producers, and arrange for their members to be paid on a scale determined by consumers' preferences for different qualities. Thus milk producers in the numerous co-operative milk marketing associations in the United States are frequently paid according to the butterfat content of their milk, and sometimes according to its bacterial content also. Danish bacon producers receive from

their co-operatives a different price depending upon the extent to which the pigs they deliver to the factories conform to the measurements most suited to provide bacon which satisfies the British market. There is no obvious reason why private marketing firms should not act in the same way, and a number do ; many, however, though they often pay a higher price for the better quality, less often announce a regular scale of payment according to grade, so that producers do not have so clearly brought to their notice the advantages of adjusting their output to consumers' requirements. Moreover, co-operative associations have an additional method open to them for adjusting supply to demand. It is much easier for them than for private firms to educate their members as to what consumers want and when they want it. In addition, they can inform them as to the probable future course of prices, and advise them whether to increase or decrease their scale of production. They can persuade, as well as pay, their members to send the right things to market, so far as possible at the right time and in the right quantities.

Fifthly, it is possible for co-operatives, provided they control a sufficient volume of the product, to modify the price level prevailing by withholding supplies from the market. The desirability of such a policy is open to question. We shall postpone a discussion of its merits and demerits until we come to analyse State intervention in agriculture.

Finally, co-operative marketing has the merit of giving the farmer, who is partly responsible for its organization, an insight into the marketing mechanism. He sees what are the problems and the difficulties of

the middlemen, and begins to realize that they may not, necessarily, be exploiting him.

These advantages are considerable, and have resulted in the setting up of a number of highly successful co-operative organizations. The Danish bacon, butter and egg co-operatives, the New Zealand Dairy Produce Export Board, the California orange growers, the numerous milk marketing associations throughout the United States, are only a few examples. But producers' co-operative marketing is not always successful and, particularly, has never made much headway in England. It has, undoubtedly, its disadvantages as well as its advantages.

First, it may be difficult to introduce in an area where mixed farming predominates, as it does generally in England. There are considerable advantages to a marketing organization in specializing in one or a group of related products. On the other hand, it is sometimes more economical for a mixed farm to sell most of its saleable products to one dealer, thereby saving collection costs. A co-operative organization will wish to start from the farmer, and so will interfere with this arrangement.

Secondly, a really large-scale organization will find it difficult to deal with local transactions, from producer to consumer in a country district. It is only where the product has to be bulked and transported long distances that large-scale operations become more economical. Here again it is less suited to English conditions, where producer and consumer are often near together, than to countries or districts where the bulk of the product is sold in distant markets.

Thirdly, it may suffer from rivalries between its members. It has been found that co-operative associations can only be operated successfully on the one man, one vote principle. In areas where most farms are of much the same size this arrangement proves satisfactory. But where both large-scale farming and the family or peasant farm are both found it rarely satisfies the large farmer, who considers that his scale of business entitles him to greater consideration.

Fourthly, there is a danger that those responsible for running co-operatives may be neither so intelligent, so knowledgeable, nor so adaptable as those running private firms. The control of a co-operative is divided between its farmer members or their representatives, and the salaried managers whom it employs. The farmers themselves will not have much time to spare from their businesses and may not have much knowledge of merchanting. Their hired representatives have not the same interest in the business as someone who himself obtains the profits. Co-operatives are not worse in this respect than joint stock companies, though they are probably worse than private businesses. There is, however, one particular danger for co-operatives. Farmers themselves earn fairly small incomes, and are inclined to see no reason why the men who sell their products should be paid more than they are themselves. But a farmer's income is inadequate to attract a man capable of running well a large business concern, so that there is a danger that a co-operative marketing association will be inefficiently managed. Undoubtedly, at one time, this was a real danger, but it appears that farmers are beginning to realize that such an economy is a false one. The milk producers

of England for instance, acquiesced in a salary of £5000 a year to their general manager.

Finally, there are disadvantages in two types of co-operative associations. First, co-operative associations organized, to begin with, as large-scale businesses, not by farmers or consumers themselves but by outsiders, have nearly always failed. Co-operatives depend for their success on the loyalty of their members, and this can only be secured if local associations are first formed, in whose management the farmers have some say. A central association can be built up from the locals, but has very rarely been successful when it has preceded them.

Secondly, if an association controls too large a proportion of the supply of any product available in any market there is a danger that it will try monopolistically to raise prices. Not only will such operations frequently prove unsuccessful and ruin the organization that attempted them, but also, even if successful from the producers' point of view, they may be anti-social. This point will be discussed more fully in Chapter IX.

CHAPTER VI

THE REACTION OF SUPPLY AND DEMAND TO PRICE

§ 1. *The Reaction of Supply in the Long Period.* In the four preceding chapters we have discussed the organization of agricultural production and marketing under more or less static conditions. We must now go on to analyse how agriculture adjusts itself to changing conditions, that is to say, to the dynamics of agriculture. We have already emphasized the function of price in equating demand and supply. This chapter analyses the effect of price changes on agricultural output and on the demand for farm products, with special attention to differences in this respect between agriculture and industry. That is to say, it discusses the shape of the supply and demand curves for agricultural goods.

Two problems have to be considered. First, what is the reaction of total agricultural output and the demand for all foodstuffs to changes in the price level of all agricultural products? Secondly, how do the output and demand for individual products change when the price of one agricultural product alters relatively to that of others? We shall consider the supply curve first and begin by analysing the effect of changes in agricultural prices in general, both in the long and in the short period.

In the theoretical long period, when sufficient time is allowed for everyone to adapt themselves and their equipment completely to some antecedent change, the

behaviour of agricultural producers differs little from that of the industrialist. In equilibrium, if there is perfect competition, the marginal unit of every factor of production of the same grade—land, labour, capital and management—must obtain the same return in all occupations. It follows that the price of every product must be equal to the average costs of production in the marginal concern, including not only the prevailing prices for the hired factors of production, but also the normal rates of earning of the labour of the farmer and his family, interest on his capital and the rent of the land. This being so, a rise in the demand for agricultural products relatively to industrial would increase the relative profitability of agriculture and result, eventually, in the diversion of land, labour and capital from industry to agriculture, until the profitability of each occupation was again equal. Similarly, a relative decline in the price of agricultural products would produce a decrease in output.

There is, however, one difference in the response of agriculture and of industry, even in the long period. An increase in agricultural output is likely to bring into operation the tendency to decreasing returns and so raise costs, while an increase in industrial output may lead to increasing returns and thus lower costs. If agricultural production is to be increased at the expense of industrial, cultivation will have to be intensified in agriculture and less fertile and less accessible land brought into production, since the land released from industry will be inadequate to provide farming space for the labour transferred. This will bring into force the tendency to diminishing returns. If, however, labour is to be shifted from agriculture to

industry, industry may obtain greater economies through large-scale production and so be able to supply a greater output at a lower cost. Thus, while an increase in agricultural output is likely to involve higher prices, an expansion of industrial output may result in lower prices.

§ 2. *Short-Period Supply Curves.* The perfect adjustment of output to prices assumed in the long-period analysis is never achieved in practice, as it would take a very long time, perhaps two generations, to work itself out, and prices are never stable for so long. In the short period, some adjustments only are possible, and the supply curve will consequently diverge from that in the long period. Moreover, as we shall see, the reaction of output to price differs more markedly between agriculture and industry in the short period than in the long.

There is no one short-period supply curve for agriculture. In the very short period farmers can only alter output by varying the proportion of their crops which they pick and sell, or the rate of slaughtering of their livestock. If prices are very low it may not be worth while, for instance, to pick the strawberry crop, which will be left to waste on the land. For non-perishable crops they can also vary their sales by storing the product in the hope of a subsequent improvement in price. In a rather longer period than this the farmer may be able slightly to increase the output of a few products by more intensive feeding or heavier manuring. Thus milk output shows an immediate but small increase if the cows are given more food.

The short period, however, with which we shall mainly deal, is a rather longer period than these, in which the farmer is given time to plant more crops or breed more livestock, and in which, consequently, it is possible for output to vary by a greater amount. There will be a substantial lag, in agriculture, between the decision to vary supplies and the actual appearance of the changed volume on the market, since both crops and animals take time to mature. For crops the lag is usually at least six months from the time of planting, and planting can take place, in most countries, only at one season of the year. For livestock it is generally considerably longer. Thus even for pigs, the most prolific farm animal, the period of gestation between mating and the birth of piglets is four months, and pigs must be four to six months old for slaughter as pork and eight months old for slaughter as bacon. For cattle the period of gestation is eight months, while fat cattle are not slaughtered until about two years old, and heifers do not calf and start to supply milk until about two and a half years old.

Such a lag, of course, is not confined to agriculture. Some time must elapse between the moment when a factory manager decides to expand output and the emergence of the new quantity of finished products from the manufacturing process. The difference is that, in agriculture, the lag is generally longer than in industry.

This short period merges by almost imperceptible changes into the true long period. In the middle-length period, for instance, it is possible to increase the capital equipment represented by breeding stock and trees. Here, again, there is a lag in agriculture

which is sometimes longer than that involved in an expansion of industrial equipment. Livestock must mature before it can be bred from, which will take about six months for a pig and about two years for a cow or a mare. Again trees do not come into bearing for some years after they are planted ; an apple tree will not produce much fruit until it is about five years old.

Thus the longer the period the more it is *possible* to alter supply. We shall discuss the extent to which it is *profitable* so to do when we distinguish between prime and overhead costs in the very short, the short and the middle-length period. Before doing so, however, we must note a difference between agriculture and industry in the sensitiveness of the reaction of short-period production to price.

§ 3. *Difficulties of Control in the Short Period.* Some farmers produce for their own consumption and not for market, and are therefore not affected at all by price changes. Even, however, when they do produce for market their reactions are different from those of industrialists.

First, a change in price can only affect the output which the farmer intends to produce. In industry, which is mainly a mechanical process, the entrepreneur can generally increase or decrease production by almost the exact amount that he intends. In agriculture, a biological process, the farmer can only rarely do so. He can plant a certain acreage of crops if the weather is not too unfavourable, or mate a certain number of animals. He cannot, however, tell what yield he will obtain per acre, or, with certainty, what number of

young animals will be born or will survive. The range of error may not be large for animal products in a temperate climate, but for crops, and for livestock in such areas as Central Australia, where extreme droughts kill large numbers at intervals, it is frequently considerable. The total output of many crops varies more with the yield per acre, which the farmer cannot control, than with the acreage, which he can. Thus for potatoes in Great Britain, acreage varied, on the average of the ten years before the war, by no more than 6 per cent from year to year, whereas yield per acre fluctuated by 9 per cent. Total production, which varied by 13 per cent on the average, was thus more dependent upon yield than upon acreage. Potatoes are perhaps an extreme example in such a temperate climate as Great Britain, but in areas subject to extreme droughts or cold yield may vary by far more than this. Thus, in Saskatchewan, one of the prairie provinces of Canada, the annual yield of wheat varied by 33 per cent of the average from 1928-37, and in the drought year 1937 was not much over a third of that in the previous year, and less than an eighth of that in the bumper year 1928.

Secondly, the farmer often pays less attention to price changes than does the industrialist. The assumption underlying most economic analysis is that the entrepreneur, be he industrialist or farmer, acts always in that way which he believes will give him the greatest profit. He is supposed constantly to examine anew the circumstances under which he is producing and selling, and to adapt his output and his methods when these circumstances change. Now this assumption may not be so far removed from the facts in a

large-scale undertaking, since the entrepreneur is a specialist in management and has the services of cost accountants. But it is certainly an ideal rather than a practice in small-scale undertakings, and especially in farming, where a large number of products are combined in the organization of the farm, and where weather plays such a large part. The calculations required, if profits are to be maximized in the light of changing circumstances, are so many that the working farmer could not hope to make them all even if he were the most intelligent of managers. In fact, since the scope for large incomes is smaller in farming than in industry, the average level of intelligence is probably also lower. As a result, traditional methods of production are even more important in agriculture than in industry, and only a few of the most enterprising farmers really adapt their output as rapidly as it would be most profitable for them to do.

It would, however, be a grave mistake to attribute the slow reaction of agricultural output to price changes mainly to the greater influence of tradition on the farmer than on the industrialist. There are also sound economic reasons for the difference. Even if the farmer was actuated entirely by the motive of maximizing his income in relation to the effort involved in producing it, and even if he were perfectly intelligent in all his decisions, yet intended agricultural output would still react differently to price changes from industrial output.

§4. *Prime and Overhead Costs.* The first reason for the difference lies in the low ratio of prime to overhead

costs in agriculture. In the long period, as we have already stated, price must equal average cost on the marginal farm, since, if the farmer or industrial entrepreneur is not covering his total costs, he can dispense with as much of each of the factors of production as he wishes, and can himself change his occupation. In the shorter period, however, this is not true. Certain costs will have been incurred in the past, or must be paid in the present unless the farmer is prepared to go bankrupt. He cannot avoid or modify these overhead costs if he ceases to produce or alters the amount he produces, so that they are irrelevant when he decides on his present output. The only costs which affect his decisions on the volume of output are the prime costs, which are directly dependent upon the amount which he intends to produce and which can be decreased or avoided if he contracts output.

The division between prime and overhead costs depends upon the length of the period allowed. In the very short period the only costs which can be avoided are the expenses of marketing the produce, such as freight charges and middlemen's commission, and the cost of casual labour employed in harvesting. These costs are therefore the only prime costs. All other costs will have been paid already or must be incurred whatever the output and are thus overhead costs.

In the ordinary short period it would be possible to dismiss most, if not all, of the hired labour, to buy no feedingstuffs for the milking cows or for the stock which is being fattened, and to do without fertilizers and fuel for the power driven machinery. These items represent the most important prime costs, additional to those which were prime in the very short period,

which will be incurred in producing one crop, or one batch of animals for sale. They are dependent upon the intended output and can be reduced if it is curtailed.

In the period of middle length there are costs which, while they are independent of output in the short period, can yet gradually be cut down and thus become prime in the middle period. These costs include the purchase of breeding stock, if they are bought, or the labour and feedingstuffs used in rearing them, and the purchase of machines.

There remain some costs which are overhead in any except the long period. These are the expenses which have been incurred in buying the land, if the farmer owns it, in draining and fencing it and in setting up the farm buildings.

Finally, there are the expected earnings of the farmer and his family. Here, again, a distinction must be drawn. The farmer himself is essential to the farm, if it is to be worked at all, and his earnings, therefore, are definitely overhead costs except in the long period. But it may be possible for some of his family to seek employment elsewhere, so that their earnings, while they will certainly be overhead costs in the very short period, will often be prime costs in a longer period, when alternative jobs are available. As we shall see later, the earnings of the farmer and his family are not, even in the short period, on quite the same basis as other overhead costs. For, although the farmer cannot reduce his expenses by dispensing with his own or his family's labour, he can vary the output by altering the amount of work they do.

There is one further item, of a rather different nature, which must be taken into account here. If a

farmer lets his land go out of cultivation it will grow weeds or even bushes, and involve him in the considerable extra cost of removing them if he wishes to bring it back into cultivation. The importance he attaches to this expense will depend upon his expectation of a future recovery of prices. If he hopes for such an improvement, he will treat the extra cost of bringing uncultivated land back into cultivation as a sort of deduction from prime costs. In this, agriculture is very different from industry, as if a machine is worked it usually deteriorates more than if it is left idle. Consequently, the value which the manufacturer places on such deterioration must be added to and not subtracted from prime costs.

It is difficult to estimate the relative importance of these various items of cost, as they differ so much from place to place and occupation to occupation. Generally speaking, however, it is true to say that the larger the undertaking and the more specialized, the more important are prime costs. Large firms employ more labour relatively to the work done by the employer than do small, and specialized firms buy more costly raw materials than those which manufacture a product through all its stages. Farming is a small-scale undertaking, which employs comparatively little hired labour, and quite frequently one farm performs all the stages of production. Prime costs are therefore relatively unimportant. The more hired labour is used, and the more farming is dependent upon purchased feedingstuffs and fertilizers, the more important are prime costs. For both these reasons they tend to be higher in English agriculture, which

has a larger ratio of farm workers to farmers than that found in other countries, and where livestock farmers generally buy at least a part of the feedingstuffs they give to animals.

Let us attempt to give some quantitative estimates of the relative importance of prime and overhead costs. In dairy farming in England and Wales hired labour accounted, before the war, for about 14 per cent of average costs, and purchased feedingstuffs for 24 per cent. There are a few other items of short-period prime cost, but, including all items, they were certainly less than half total costs. Again in dairy farming in Michigan, hired labour was only 6 per cent of all costs, fertilizers and seeds about 20 per cent and other current costs nearly 20 per cent, or again rather less than half. On the other hand the rearing of pigs and hens is largely a processing industry, and it is estimated that in England the cost of feedingstuffs, often mainly purchased, represented about 70 per cent of the cost of producing pigs. In the peasant countries, where all labour is family labour and farms are generally integrated, prime costs would certainly be very much less than half total costs, and probably less than a quarter. If we take industry, however, we find that, in Great Britain, 60 per cent of the value of gross output was represented by purchases of raw materials, and nearly 20 per cent by wages, making a total of 80 per cent prime costs and only 20 per cent overhead. Of course, for extractive industries such as coal- or copper-mining, the cost of purchased raw materials is also small, as it is in agriculture. But such industries usually hire most of their labour, so that prime costs, here, are again high.

Variations in the proportion of prime costs to total costs affect output in two ways. First, they alter the number of farmers who wish to move out as price falls, and, secondly, they determine the changes in the amount produced by each farmer. If price falls, any entrepreneur, be he agriculturist or industrialist, will stay in business so long as total returns exceed prime costs by at least as much as he can earn elsewhere by his own labour and with the aid of the equipment which he owns or must pay for whatever he produces. If the price decline affects all agricultural products—and this is the situation that we are at present considering—the farmer's equipment may well be practically useless outside agriculture, and alternative opportunities therefore small. It will consist, in the short period, partly of the land itself and of improvements to it in the form of drainage, fencing and fertilization, partly of the farm buildings and farm house, and partly of agricultural machinery and stock. None of these are of much use except in farming. In addition, the farmer himself, and any of his family who work with him, will have been trained to farming and have acquired skill which is of little value in other occupations. Moreover, if the price fall is not confined to agriculture, but is associated with a general industrial depression, the farmer and his family cannot be sure of obtaining any other work at all. If that be so, the farmer will be prepared to go on working for a return only a little above prime costs. Therefore, when prime costs are only a small part of total costs, price may fall very substantially before the farmer gives up. The shorter the period allowed, the fewer items will be included in prime costs and therefore the less likely is it that the farmer will give up his farm.

When agricultural prices rise relatively to other prices, the obstacles to an increase in the number of farmers are rather different. Anyone who can raise the necessary capital and obtain some land can become a farmer, but neither of these requirements can be met rapidly. It is not easy for a new man to borrow money, and only land beyond the margin of cultivation, which usually requires considerable work to render it fit for farming, can readily be obtained. On the other hand, factories which wish to start, since they use less land, can generally divert any they need from agricultural uses. Thus, both for price decreases and for price increases, the number of farmers is only slowly adaptable to price changes.

Supply can alter more rapidly through changes in the amount produced by existing farmers. Once again, overhead costs are irrelevant to the farmer's decision. He will only consider the relationship between, on the one hand, the receipts for his product and, on the other, his prime costs and the efforts he and his family will incur as he varies his output. If prices fall, the entrepreneur will dispense with those marginal units of his hired factors of production which are least productive. He will not buy or hire any prime factor which costs more than the now diminished value of the marginal unit of product that it contributes to total output. Where output is dependent upon purchased feeding-stuffs or fertilizers, the farmer will almost certainly use less and produce less intensively. Where labour is hired the result is less certain; for one labourer may represent a third, or even a half, of the total labour force of the farm, and the fall in prices may not justify as violent a reduction in output as dismissing him

would involve. Generally speaking, since prime costs represent only a small part of total farming costs, the savings open to the farmer through decreasing output are small, so that it is not likely to contract much ; this is especially true since prime costs per unit will often be rapidly reduced as farming becomes less intensive, and the scope for savings will consequently diminish. Again, the longer the period allowed, the more important will be prime costs, and the more is production likely to decrease as price falls.

Similarly, when price rises, there may be some expansion of output through the hiring of more prime factors. But, owing to the tendency to diminishing returns as labour, feeding-stuffs or fertilizers are used more intensively, it will not be worth the farmer's while to increase production as much as he would if costs were constant.

In industry the position is very different. Entrepreneurs can diminish costs considerably by cutting down output, since they can hire less labour and buy fewer raw materials. Indeed, the amount produced in the short run is almost wholly dependent upon the quantity of prime factors hired, and is very little affected by the amount of work done by the entrepreneur.

§ 5. *The Farmer's Share in Output.* In farming, however, the amount of work done by the farmer and his family is very important. In peasant farming, particularly in the intensive type practised in China, variations in output are brought about almost wholly by changes in the quantity of work done by the farmer's family. The farmer will go on working until

the satisfaction given him by the marginal unit of income that he obtains just compensates him for the marginal quantity of effort involved in producing that income. Now a reduction in the price of the things the farmer sells will reduce the marginal quantity of income earned by his last hour's effort, but it is by no means inevitable that it will induce him to work less, since it will also have reduced the family's whole income. As a result they will have to cut down their consumption, so that the marginal utility to them of their last unit of income will be increased, being now spent on a more urgent need than before. It is therefore certain that they will be prepared to work harder than before for an *equal* increase in income, and quite probable that they will work harder for a *smaller* marginal income, since this will now be the means of satisfying more urgent wants than those which were previously satisfied by the larger marginal income.

A family farm is thus quite likely to produce more, rather than less, as prices fall. The poorer it is to begin with, the more efforts will it be prepared to make to prevent a further cut in income. On the other hand, the poorer it was to begin with, the longer the hours that it probably worked. And the longer hours it worked, the more irksome and the more tiring would be any further extension of these hours. Since these two tendencies oppose one another it is impossible to say whether a richer or poorer family is the most likely to increase output as price falls.

Similarly, if prices rise, the family may produce less, as it can obtain the same income as before with a lesser expenditure of effort.

§ 6. *The Reaction on Costs.* The reason why a fall in price may lead to an increase in the output of a family farm is that, as a result of altering the farmer's income, it reduces, in effect, the "costs" of the family labour by modifying the marginal incomes which are necessary in order to induce the family to work for varying amounts of time. If a fall in price reduces these "costs" by more than the price decline, then output will expand. In discussing the effect of a price fall on the output of a farm with hired prime factors we tacitly assumed that the cost of these factors remained unchanged. The difference we found between the behaviour of a family farm with few prime costs and that of a farm with hired labour depends almost entirely on this assumption. If, in fact, a fall in price were likely to reduce prime costs by as much as it lowered the "costs" of family labour, there would be no difference in the reaction of the two types of farms.

It is, in most circumstances, reasonable to assume that a change in the prices of all agricultural products will alter the farmer's willingness to work for a given marginal income more than it will alter prime costs. But it is not true, in general, that a fall in the price of agricultural products will leave agricultural prime costs entirely unaffected. If the fall in price is the result of a shift in demand from agriculture to industry, and if the prime factors used in agriculture are entirely unspecialized between agriculture and industry, then prime costs will not alter appreciably, since the factors dismissed from agriculture will at once be absorbed in industry. In fact, of course, labour is to a certain extent specialized, and some of the raw materials of

agriculture, such as fertilizers, are not required in industry. The fall in the demand for these prime factors will thus produce some decline in their price, before they will be transferred to other uses. For fertilizers, but not for wages, this decline may be as great as the fall in the price of the farmer's output.

If the fall in price is not confined to agricultural products, but is general to all commodities, it will be difficult for any factors to find employment elsewhere, so that their prices will almost certainly fall. Actually, however, costs rarely fall as fast as agricultural prices, largely owing to the stickiness of wages. Normal wages, particularly in farming, are sometimes comparatively little above the amount the worker would receive in unemployment pay or poor relief if he were out of work. In addition, wage-earners, especially in industry, often unite to prevent a reduction in wages. For both these reasons, costs, though they do decline in a depression, fall far less than prices.

Once again we may note a difference between industry and agriculture. Wages are even more immobile in industry than they are in agriculture, so that prime costs fall less in industry than in agriculture during a depression. This is a further factor tending to make the decline in agricultural output as price falls less than that of industrial.

So far we have been considering the adjustment of agricultural output as a whole to a change in the price of all agricultural products. We have found that, although a decline in industrial prices tends to diminish output even in the short period, this is by no means universally true in agriculture. The prime costs of hired factors form a much smaller part of total costs

in agriculture than in most industrial undertakings, while these costs are usually reduced more, in times of depression, in agriculture than in industry. Moreover, output is, in a number of farms, largely dependent upon the amount of work done by the farmer and his family, which may be increased rather than diminished when prices fall. Thus agricultural production, as a whole, is slow to adjust itself to price changes. There is clear evidence that this is so. During the world depression of prices from 1929 to 1932, while total world manufacturing production, as measured by the League of Nations, fell by 37 per cent, and non-agricultural primary production by 31 per cent, agricultural production only fell by 1 per cent. Agricultural output, as a whole, is comparatively little affected by prices in the short run.

§ 7. *Shifts of Supply within Agriculture.* We have now to consider the effect on the output of individual agricultural products of a decrease or increase in the price of that product only. In the long run, a fall or rise in the price of any product will lead to a decrease or increase in its output. The extent of the change must depend upon how rapidly costs alter as the scale of production is changed. Every commodity will be localized in the places most suitable, under all the circumstances, for its production. If its output is increased, farmers must grow it in areas less suitable, either because of climate, soil or distance from the market, and must intensify existing cultivation, thereby, perhaps, obtaining less advantage from the diversification of farming.¹ For this reason, an

¹ See Chapter III.

increase in the output of any product will result in higher costs, but, for the same percentage increase in output, costs are unlikely to rise as fast as they would have if all farm output were increased.

In the short run, however, individual agricultural commodities respond very differently to price changes than does agricultural output as a whole. The reason for this difference is that most agricultural products are produced together, and are generally joint products, or represent a composite demand for the factors of production.¹ This intermingling of production, to begin with, complicates the farmer's decisions. It is almost impossible for him to tell what are the marginal costs of any particular product. Thus suppose beef prices fall. Should he decrease output? If he does he will have less farmyard manure to put on his potatoes; and potato prices may have risen. In spite of the difficulties, however, there is no doubt that many farmers do respond to changes in relative prices. Thus, in England, a rise in pig prices by 10 per cent before the war increased pig numbers 21 months later by about 6 per cent, and a rise in wheat prices had a very similar effect on the acreage of wheat planted a year later.

Agricultural output, as a whole, is insensitive to price changes, particularly in the short period, since the land, capital equipment and acquired skill of agriculture are of little value in industry. Individual farm products are generally sensitive to price, as a large part of the capital they need, and much of the skill, is almost equally useful in producing other products. This, clearly, is particularly true on a mixed farm. There the farmer and some of his workers will

¹ See pp. 19-21.

have had experience in growing many products and can, without great difficulty, vary the proportions in which they are produced. A great deal of the machinery used for wheat production is equally suitable for other cereals, and these can take the place of wheat in the rotation. The sheds used for housing beef cattle can be adapted, though at some additional cost, for dairying, while dairy cows can be killed for beef if milk prices fall. It must be noted, however, that supply will alter more if the price of some product alters relatively to that of others which use the same equipment, than if the prices of both such products varied together. Thus wheat acreage in Great Britain is rather more affected by changes in the price of wheat relatively to that of barley than to changes in the price of wheat relatively to any other individual product.

There are some farm products, of course, like coffee in Brazil, or cotton in some of the Southern United States, which are almost the only crops which can be grown in the district. Where this is so, output will respond to price changes in much the same way as does total agricultural output in countries of diversified farming. Even on a specialized farm, however, the farmer can generally more easily learn to grow a new farm product than he can turn to industry, and much farm equipment can be adapted from product to product, so that a fall in the price of the specialized product alone will result in some diversion to the other farm products.

Apart from such crops as these, the output of any individual farm product is generally as responsive to price in the short period, if not more so, as is the output

of any individual industrial product. The capital equipment of agriculture is more adaptable between product and product than the capital equipment of industry, which compensates for the lesser degree of adaptability produced by the low level of prime costs in agriculture.

§ 8. *The Demand Curve.* The conditions determining the shape of the demand curve for agricultural products do not differ very materially from those determining the demand curve for other products. Since this book is concerned largely to point out the differences between the economics of agriculture and the economics of other industries, there is therefore much less to be said about the demand curve than there was about the supply curve. This does not mean that it is less important, but merely that it is less peculiar.

There is, however, one very important difference between the demands for agricultural and for industrial products. Agriculture, as we have seen,¹ produces mainly foodstuffs, which are one of the main necessities of life; as a result, the demand for all agricultural products, taken together, tends to be inelastic. If the prices of all foods decline, consumption will not greatly expand, nor will it greatly contract if food prices rise.

There will, however, be some alteration. First, if all food prices fall, the same amount of income will buy more goods than it did before. In other words, real income will increase and there will be a consequent expansion in the demand for food. This effect we shall discuss in greater detail in the next chapter.²

¹ See p. 8.

² See pp. 125-30.

But this is not all. Besides affecting real income the reduction in food prices will have made food cheaper relatively to industrial products. It is therefore possible that some people will prefer to buy better food at the expense, for instance, of more elegant clothes or more cinemas. There may be some substitution of agricultural for industrial products. But this substitution is not likely to be very important, as foodstuffs, taken as a whole, satisfy very different wants from other types of goods.

Similarly, if food prices rise, there must be some contraction in consumption because of the fall in real incomes, but there is not likely to be much substitution of industrial for agricultural products. The demand for food, taken as a whole, is inelastic, just as its supply.

Moreover, just as the supply of individual farm products is far more elastic than that of agricultural output as a whole, so is the demand for individual products. If the price of a single foodstuff varies we can usually disregard the effect of this change on real incomes, as only a small part of any given income will be spent on one food, and can take into account only the possibility of substituting the product of which the price has changed for or by other goods. Now many foodstuffs satisfy the same wants and are readily substituted one for the other. Consumers demand, in the main, any vegetables, rather than cauliflower, or cabbage, or brussels sprouts. They want cooking fat, not particularly lard, or oleo-margarine, or olive oil. They require meat, rather than beef, or mutton, or pork. They may, and usually do, have some preference for one product over another, just as they do for some

variety of one product over another variety, for sirloin over loin, for fresh over chilled and chilled over frozen beef, for English or for Danish bacon, and so on. Thus the demand for the different products is elastic, but not completely elastic. Moreover, the elasticity of demand will be less if the prices of goods which are a composite supply, like beef and mutton and pork, vary together, just as will be the elasticity of supply for products, such as beef and milk, which satisfy a composite demand for a considerable part of the factors of production used in growing them.

There are other foodstuffs, however, for which the demand is far more inelastic. There is no ready substitute for bread, or potatoes, or liquid milk, and the amount of these products consumed will not vary very much if their price is altered.

When any commodity can easily be substituted for another, it is quite certain that a fall in price will cause an increase in the amount bought, and a rise in price a decrease. When it cannot, it is possible, though unusual, for consumption to decrease as price falls. This can only occur when the commodity absorbs a large part of consumers' incomes, so that a change in its price alters appreciably their real income, that is to say, the total amount of goods and services that they buy. Then a fall in its price will raise real incomes. As we shall see later, the consumption of most foodstuffs increases as real incomes rise, so that a fall in price will increase consumption both through the process of substitution and through the income effect. But for a few commodities, sometimes called "inferior" goods, consumption falls as income rises. For such products the income effect of a fall in price,

tending to decrease consumption, may outweigh the substitution effect, tending to increase it, so that, on balance, consumption decreases as price falls. Thus in Ireland, in the early nineteenth century the country people's staple diet was the potato, the cheapest product they could obtain. When potatoes were plentiful and cheap they could satisfy a great part of their hunger more easily than usual, leaving more money over to buy other foods. Thus, as the result of the fall in potato prices, they actually substituted other foods, wheat or even meat, for part of the potatoes they usually bought.

This result, however, is rare. It only comes about 'when people are too poor to buy a large variety of foods, and when there is one foodstuff far cheaper than others. As a general rule, a fall in the price of one product causes its consumption to increase, often considerably.

CHAPTER VII

THE TREND OF AGRICULTURAL EARNINGS

§ 1. *The Interdependence of Agriculture and Industry.*

We are now in a position to examine the probable effect on agricultural prosperity of the more important changes in the underlying conditions of demand and supply which may be expected to occur. This prosperity is measured by the real earnings of the factors of production in agriculture, or, in other words, by the quantities of goods and services which can be bought with the wages, interests, rents and profits earned there. In this chapter we shall deal with long-period trends, and in the next with short-period fluctuations about these trends.

The most important single fact, which must be borne in mind throughout the discussion, is that, in general and in the long run, agricultural and industrial prosperity must go together. Workers choosing their occupation in life, money seeking investment, land offered for hire, will tend to move to that occupation which promises the highest return. It may be that, to begin with, some change will benefit industrial workers, but harm farm workers. This difference, however, cannot last; any rise in incomes, no matter where it be initiated, will eventually spread its beneficial effects to other occupations. The speed with which it does so will depend upon the rapidity with which

factors of production can adapt themselves to the change, and move from industry to industry.

When the factors are mobile, their earnings will depend upon the general conditions affecting the size and distribution of the national income. These conditions cannot be discussed in any detail in a book which deals with the application of economic principles to agriculture without attempting to set forth in full the principles themselves. The effect on agricultural employment, standards of living and prices of the more important changes must, however, be briefly indicated. To begin with we shall ignore any variation in the capacity of different units of the same factor of production for different types of agricultural production, and treat each factor as though it were homogeneous.

§ 2. *The Effect of Increasing Population.* In the first half of the nineteenth century, and, indeed, up to the present century, students viewed with particular concern the effect of an increase in population upon the standard of living. Interest in this question was aroused by Malthus' famous *Essay on the Principle of Population*. The foundation of Malthus' argument can be expressed quite easily in terms of our earlier analysis; Malthus himself used a rather different approach. If population were to increase—and we are not here concerned with the reasons which Malthus gave for expecting this to happen—there would be more labour and capital seeking employment. The amount of land, however, would not change, so that each worker, assisted, perhaps, by the same amount of capital, would have to work on less land than before. The increased number of workers in farming would increase

agricultural production, but, owing to the tendency to diminishing returns, not proportionately to the rise in numbers. The larger number of workers in industry might increase industrial output there more than proportionally, owing to increasing returns, but it is likely that, except in a fairly sparsely settled country, diminishing returns in agriculture would outweigh increasing returns in industry. In other words, the total output of goods and services would probably expand by less than the rise in numbers, so that real incomes per head would be reduced. The only people who would benefit, in the long run, from such a change would be the landowners, since the increased demand for land would raise rents more than prices, and would therefore increase the real earnings of those who received them.

The change would affect not only the supply of products, but also the demand for them. The larger number of people would demand more goods, but not proportionately more, as their incomes per head would most probably be lower. The demand for food, as we shall see in the next section, would increase more than the demand for other products, since people would wish to spend a larger proportion of their smaller incomes on necessities. It follows that more of the increased labour force would be required in agriculture than in industry, and that, because of diminishing returns in agriculture, the prices of farm products would have to rise relatively to industrial prices.

In the same way a decrease in the population would ultimately increase real earnings and lower agricultural prices, unless population were sparse and increasing returns in industry important.

The argument presented here is incontrovertible, provided the only change that occurs is an increase or decrease in population. The tendency to diminishing returns is one of the most definitely established agricultural facts, and, once this is accepted, the rest follows. If other things remain the same, an increase in population will lower standards of living, unless increasing returns in industry are very important, and will increase the proportion of the population employed in agriculture. In fact, however, the increase in population in the nineteenth century in England was associated not with a fall but with a large rise in standards of life, and all of this increase cannot possibly be attributed to reduced costs in industry as its scale of production became greater. There is another simple reason, since other things did not, during this period, remain the same. If, through inventions or the application of inventions, the technique of production is improved, then the position is radically altered.

§ 3. *Real Income and Demand.* We must, therefore, next consider the effect on agriculture of an increase in technical efficiency. The first result of such an advance, no matter in what industry it occurs, is to increase the real incomes of the community. It becomes possible to produce the same amount of goods as before with fewer factors of production, so that the factors released can produce other things and add to the total output available for consumption. We have already referred, more than once, to the effect of an increase in real incomes on the demand for farm products and we must now discuss this relationship more closely.

The level of real incomes is, undoubtedly, the most important single fact determining the demand for food. If they are low, people will be able to satisfy only their primary needs. Food of some sort is obviously a basic necessity of life, as a certain consumption is essential to keep people alive and enable them to work. There are other necessities, such as shelter, fuel and clothing, which are more important in a cold climate than in a hot. If incomes are very low, only these things can be bought. The food demanded will be of the cheapest variety, that which supplies the calories necessary for existence and work at the lowest cost.

As incomes increase, the demand for most foodstuffs will expand also. People obviously prefer more food than will prevent them from starving and, if they have higher incomes than are necessary to provide the basic necessities, will spend some of the increase on more food. To begin with the demand for nearly all foodstuffs may expand, though not at an equal rate. People will increase to the greatest extent their purchases of those foodstuffs which are more expensive as sources of calories, but are preferred either because of their taste or because they contain other desirable elements such as animal proteins, minerals or vitamins.

After a certain income limit consumers will cease to demand greater quantities of food, as there is a limit to the capacity of the human stomach. They will, none the less, continue to spend increasing amounts of money on food, by transferring from the cheaper to the dearer foods, from the inferior to the superior qualities.

The foodstuffs for which demand tends to increase most as incomes rise are the "protective" foods, fruit,

vegetables, fresh milk and eggs, which cost more per calorie than other foodstuffs but contain a large proportion of the proteins, minerals and vitamins which are necessary for the maintenance of full health. The demand for butter and meat also increases as income rises, but to a lesser extent than in the previous group and there is some expansion in the demand for sugar. It is probable that, in England, the demand for cheese and for such fats as lard, suet and dripping increases as incomes rise from a very low to a medium level, but then diminishes again as incomes become still greater. Consumers with very low incomes appear to economize in the use of even such cheap foodstuffs. As they become less poor they can afford to buy more ; but, when they grow comparatively well off, they turn to more expensive foods, to meat instead of cheese, to butter instead of the cheaper fats.

There are, however, some cheaper foods whose consumption is scarcely affected by income, and others whose consumption actually diminishes as incomes rise, even from the lowest levels. Thus much the same amount of bread or potatoes is bought, whatever the income, and an increase in incomes tends to decrease the demands for such products as condensed milk and margarine, which are cheaper but inferior substitutes for other products. The very poor buy these products in preference to liquid milk and butter, but turn to the higher priced products if their incomes rise.

There are also alterations in the demands for different types of the same product. We have already seen that consumers are not indifferent as to which variety of a particular product they buy.¹ As incomes increase

¹ See pp. 119-120

they will tend to shift from the cheaper to the more expensive varieties, from frozen to chilled, or from chilled to fresh beef, from stored to fresh eggs, and, generally, from imported to home-produced products. This shift in demand as incomes rise is particularly important to an agriculture, such as that of England, which is situated in close proximity to city markets for which it supplies part, but not all, of their needs. Such an agriculture has a monopoly of the fresh products demanded by the cities, and will benefit, particularly, from any increase in their prosperity.

Thus, as incomes become larger, the demand for most foodstuffs will expand, and the demand for food as a whole will certainly increase. It is probable, however, that expenditure on food will not, after a certain point, increase as rapidly as does income. For, as incomes rise and it is possible for people to obtain more than basic necessities, they have the choice of spending their additional income either on pleasanter food or on a wide range of non-agricultural products and services. It is probable, and the available statistics support this view, that they will spend a smaller proportion of the increase in income on food than they did of the original income. Consequently we can say that, as incomes increase, the demand for food will rise, but less than proportionately to the rise in incomes.

The demand for other agricultural products, which are not foodstuffs,¹ will also increase, probably to the same extent as for most industrial goods and therefore more rapidly than the rise in incomes. These goods, however, are so unimportant in agricultural output

¹ See p. 8.

compared with foodstuffs that it is true to say that, though the demand for agricultural products increases as income rises, it does so less rapidly than for other products, so that a rise in incomes involves a *relative* decline in the demand for agricultural products.

Thus, if a community becomes progressively richer, as did England, on the whole, during the last century, its demand for food will increase. But the demand for industrial products will probably expand more rapidly, so that though the absolute demand for food will rise, the relative demand will fall. Again, if it becomes progressively poorer, as might happen if the price of imports were to rise steadily compared with exports or if a larger and larger proportion of the national income were to be used for armaments or national defence, the demand for food would fall, but less rapidly than the demand for other products.

The demand for food will be affected not only by the size of any community's real income, but also by its distribution. Two communities with equal real incomes, but one composed of millionaires and paupers, and the other with equal incomes for every citizen, would have very different demands for food. First, the distribution between the various products would not be the same. The paupers would demand only the cheapest foods, the millionaires the most luxurious, so that the demand for potatoes, bread and margarine, and for champagne, quails and caviare, would be greater in the community with unequal incomes, and for meat and milk probably less. Secondly, the aggregate demand for agricultural products would almost certainly be smaller. If income were transferred from the millionaires to the paupers the decline

in the amount spent on food by the few people who were previously millionaires would be less than the increase by the many who were previously paupers. Thus, the more equal is the distribution of income, the greater will be the demand for agricultural products.

§ 4. *Real Income and Marketing Costs.* So far the demand we have been discussing has been the consumers' demand for food, sold to them retail. It is probable that some of the increase in demand as incomes rise will be absorbed by higher marketing costs. In other words, the amount paid to farmers will not increase so rapidly as the amount that consumers pay. For this there are several reasons.

Firstly, the increase in output necessary to satisfy the larger demand may have to be produced, in part, from land more distant from the market than the land already cultivated. This will certainly be necessary if agricultural technique has not changed, but will not occur if an invention cheapens agricultural production on land near the market. In so far as the agricultural area is extended, the average distance over which food-stuffs must be carried will be increased, and marketing costs will rise. Of course, if the improvement that occurs is in marketing, marketing costs will be reduced.

Secondly, as incomes rise, a greater variety of food-stuffs are demanded. Costs of distribution will in all probability be greater if a large number of goods must be dealt in. It is possible, but not certain, that this may be counterbalanced by lower costs resulting from the larger turnover of goods as consumption increases with income.

Thirdly, it is certain that, as consumers grow richer, they will require more services to be rendered them by distributors. They will dislike to carry their purchases home and will ask to have them delivered. They will not be bothered to pay cash, and will want weekly or monthly accounts, which involve both greater book-keeping expenses and the granting of credit. They will prefer to have the goods they want offered in packages of convenient size, which they can buy in less time than it takes to weigh out a specified quantity. All these services add to the costs of distribution. Moreover, they tend to make the market more imperfect, by providing devices other than price by which the retailer can endeavour to attract consumers. In this way, again, they are likely to increase the charges which middlemen make for their services.

Finally, an increase in real incomes is frequently associated with the growth of industry and of cities. This development clearly makes distribution more expensive, by increasing the distance between producer and consumer. At the beginning of the nineteenth century about two-thirds of the population of England still lived on the land, and no complicated marketing chain was necessary. Now only a fifth live in the country, and all the marketing services that we have already described must be provided.

Thus if real incomes rise owing to improving technique, the demand for farm products on the farm will rise, but less than proportionately to consumers' demand, which, in its turn, will not increase proportionately to the rise in incomes.

§ 5. *The Effect of Improving Technique.* If costs of production are lowered, the change will not merely affect the demand for agricultural products but will also change the conditions of supply. The effect on supply, and the ultimate reactions on earnings, will depend on the nature of the invention that leads to reduced costs.

Let us consider first an improvement in technique taking place outside agriculture, in an industry which does not supply any raw materials or machines to farmers, or assist in marketing its products. Then the only impact of the invention will be through the increased demand for agricultural products from those people who find their real incomes increased by the change. They will not wish to spend all their increase in incomes on the products for which costs have been reduced, but will certainly wish to buy more food as well. The price of foodstuffs will, therefore, rise relatively to those industrial products whose costs have been reduced by the invention. As a result, incomes will be higher in agriculture than in industry until some land, labour and capital, released from industry by the improving technique, are diverted to agriculture in order to expand output there also. The greater industrial output can be produced by fewer men, since technique has improved, but the greater agricultural output required can only be provided with more men, since we are assuming no change in farming technique. When equilibrium is attained, workers and capital will earn the same in agriculture as in industry—as they must if there is to be true equilibrium—but prices will have risen in agriculture compared with industry. For this there are two

reasons. First, costs were reduced in industry and not in agriculture. Secondly, the expansion of agriculture in response to the increased demands for food brings into play the tendency to diminishing returns and raises marginal costs.

If the improvement in technique, though still outside agriculture, takes place in transport or distribution, or in industries which supply raw materials or machines to farmers, the result will be a fall in the price of these services or products. If the fall is in distribution costs, it is tantamount to an increased demand and a higher price for agricultural products at the farm, if in raw material prices, it results in a larger margin between receipts and prime costs. In either case new people will be attracted into farming, supply will increase and retail prices fall. Equilibrium will be attained with more people in farming but fewer in the occupation where the improvement occurred; for the reduction in costs took place because it became possible to do the same work with less labour than before; therefore, since the demand for food is inelastic, consumption will not increase enough to require as many people as before in these occupations.

For these results to be correct, the reduction in costs must be not only in industries outside agriculture, but also in machines or requisites which cannot perform the same operations as does labour. Sometimes machines can be so substituted, if time is allowed for reorganizing methods of production; and at present we are only concerned with the long period, when all readjustments to the initial change have been made. Thus the combine harvester is a substitute for labour in harvesting crops and artificial fertilizers can

be used instead of farmyard manure. When an invention provides such products more cheaply, the results of its introduction are similar to those when the improvement in technique occurs within agriculture itself.

If a discovery is made in agriculture, if, for instance, the scientist "makes two blades of grass grow where one grew before," the immediate effect will be a reduction in the price of the products affected. Let us assume that the invention applies to the whole of agriculture. Then, since the demand for all agricultural products taken together is inelastic, producers will receive a smaller aggregate sum for the larger than they did for the smaller output. In other words so long as the number of workers and the amount of capital employed in agriculture remain unchanged, earnings there will be relatively depressed, and will so continue until resources have been transferred out of agriculture. When this has occurred prices will still be lower than in industry, since costs have been reduced but earnings will again be equal in the two occupations.

If the improvement in technique is general throughout the whole field of agriculture and of industry, then, again, resources will need to be diverted out of agriculture. For real incomes in general will rise, and the demand for industrial products increase more rapidly than for agricultural. As a result, since, on our assumption, output per head has risen by an equal proportion in both occupations, labour and capital will be transferred from agriculture to industry. This adjustment will further reduce marginal costs in agriculture, as the land will be cultivated less intensively, and it may

also lower them in industry, if increasing returns are operating.

Summing up this rather involved section of our discussion, we can say that an improvement in technique will generally, *in the long run*, increase the real income of all the factors of production, both in agriculture and outside it. This generalization, it is true, over-simplifies the problem, as it neglects the difference between different units of the same factor, and particularly between different units of land. This is a point which is better discussed when we deal with sectional differences in prosperity.

§ 6. *The Immobility of Factors of Production.* Our discussion, so far, has assumed that the various factors of production transfer themselves from occupation to occupation until their earnings are equal in each, and has described the equilibrium reached. Clearly, this is a very long-period assumption. As we have already seen, the factors of production are especially immobile between agriculture and industry. Capital cannot be transferred when it is embodied in capital goods such as buildings, machinery or land drainage until these goods wear out and are not replaced. Labour, also, once it has acquired skill and established itself in some place, is unable or unwilling to move. It is only the new generation, when it starts working, that moves at all readily between job and job, and even here mobility is not complete. A son will know more about his father's occupation than about others, especially if these other are in different localities, as is usually true of agriculture and industry. In addition, it will generally be cheaper for him to live with his parents

than elsewhere. Nor is this all. Some people, whether because of inclination or ignorance, or because of lack of education and enterprise, will never move from the locality in which they were born. This is probably particularly true of workers in agricultural areas, many of which are still rather isolated from the rest of the community. Thus only a part of each generation of labour moves in response to a difference in prospective earnings, and such a difference between agriculture and industry may persist for a considerable period without the transfer of enough labour or capital to remove it.

We found in the preceding sections that an increase in population, or a considerably more rapid improvement in industrial than in agricultural technique, or a rise in general or in agricultural costs, tends to produce a transference of labour and capital from industry to agriculture. This movement is brought about by relatively higher earnings in agriculture. The reverse changes, and, in particular, a general improvement in efficiency, or a fall in agricultural costs alone, will require the movement of resources out of agriculture, and relatively lower earnings there until this is brought about. The slower are the factors of production in moving, the longer can the discrepancy in earnings persist.

Now, for the last century and a half, technique has been progressing very rapidly, and the world as a whole has been growing richer. Methods have been improved both in industry, transport and agriculture. The effect of this change has more than counter-balanced the effect of increasing population. Agricultural earnings have tended to be lower than in industry, for the increasing standard of life has

demanded more people in trades producing comforts and luxuries, fewer in those producing necessities, and agriculturists have not changed their occupations rapidly enough to prevent farm incomes from being lower than industrial.

Such a development must inevitably be associated with economic progress. Man can only move forward from the primitive state if more and more of his energies are diverted from producing food. This transference, in a world where specialized labour is the most efficient, will only be brought about if earnings are higher in other occupations. The slower people are in moving, the greater the difference will be. If improvements in technique constantly occur and only a proportion of each generation is mobile, then there will be a permanent difference in earnings. The discrepancy created by one invention may not have been sensibly diminished by the transference of resources before another change increases it again. In fact, agricultural earnings have been so depressed during the last century. Opinions differ as to whether they are likely to remain so in the world as a whole. In this country, certainly, there are now strong forces tending to reduce if not eliminate the difference.¹

§ 7. *Regional Differences.* The rapid pace at which technique in general has improved is not the only reason for the relative depression in British agriculture since 1870. To understand the other reason we must abandon our original assumption that each unit of any factor of production has the same capacity for every type of agriculture, even though there be short-period

¹ See p. 166.

differences in its suitability for agriculture as against industry.

Clearly this assumption is not a very close approximation to the facts. Land varies both in productivity and in accessibility to the market, and different pieces of land are more suitable for growing one product, or for using one method of cultivation, than for others. Capital, though it may be almost completely mobile in the long run, is embodied, often for many years, in specialized forms, or is inextricably attached to a particular piece of land. Labour differs, to a certain extent, in inherent capacity for different occupations, and, to an even greater degree in any period except the longest, in the skill that it has acquired in varying forms of production. Moreover, like capital, it may be more or less firmly attached to some particular piece of land ; if this be one country it is more reasonable to assume that its citizens are completely immobile between that country and another than that they are completely mobile.

There may thus be many changes which, although they benefit the whole community, yet decrease the incomes of some people. First, an increase of real incomes, while it will raise the earnings of those who produce the protective foods which will be in greater demand, will damage those owning land or equipment or immovably attached to land suitable for producing the cheaper products, such as rye, for which demand diminishes as people become richer.

Secondly, an invention of a new machine or of a new method of farming will harm both the owners of tools now shown to be inferior, the specialized workers who previously performed the work now undertaken

by the machine, and those owning or working on land less suitable for the new methods, but will benefit in particular those with special facilities for using the new inventions. Thus the farm labourers who destroyed threshing machines in the riots of 1830 and 1831 were quite right in thinking that such machines would tend to lower their immediate incomes. Again, the invention of the combine harvester and of methods of dry land wheat farming have reduced the incomes of farmers who previously grew wheat in districts less suitable for large-scale operations or in damper climates.

Thirdly, a reduction in the cost of transport will help agriculturalists far from the big consuming markets but will damage those with high costs of production who are near the market. Thus the development of ocean transport and of railways in the United States led to the flooding of the English market with cheap wheat in the 1870's, while the introduction of refrigeration lowered the price of meat and dairy products in the 1890's. Both these changes made the agricultural population of England worse off, for a time, than it had been, though it helped America and Australasia. Again, the rapid improvement in road transport greatly reduced the cost of transporting perishable goods such as milk to city markets, thus making it possible for dairying districts such as the South-West of Scotland to supply these cities with liquid milk, and diminishing the favoured position of the areas near the market.

If the interests of landlords be disregarded, these divergencies in the immediate interests of different regions are only of great importance if they affect the whole, or most, of a country. For it is only between

different countries that labour is immobile in the long run. Many of the developments we have mentioned may have this effect. Thus considerable mechanization is only possible in areas where farms are generally large, and the competition of products grown by these methods must harm the peasant countries with their small farms. Most important, however, is the third change, since a reduction in transport costs is almost bound to reduce the incomes of farmers in those countries where the great consuming markets are found. This was the second, and probably the more important, cause of the agricultural depression which prevailed in British agriculture at the end of the nineteenth century.

Such developments, however, can only permanently damage a country if they affect the things it *sells* to other countries. The introduction of long staple cotton in Egypt permanently reduced the income of their competitor, the Southern United States, while the discovery that chilled, instead of frozen, meat could be sent from Australia, if it was placed in an atmosphere of carbon dioxide, was harmful to South America, which previously had a monopoly in exporting this product to the British market.

A reduction in the cost of goods which a country chiefly *buys* can, in the long run, harm only its landlords and will benefit everyone else. Farmers and their workers can turn, instead, to other occupations within the country which now show a greater comparative advantage.¹ This is, indeed, what happened in England in the late nineteenth and in the twentieth century. The cheapness of food made possible a big increase in

¹ See R. F. Harrod, *International Economics*, Ch. II.

the standard of living of farm workers as well as of industrial. Since 1870 the real income of the country has certainly increased far faster than the population, while those remaining in farming are also better off absolutely, though not relatively to others. Cheap food was essential to this improvement.

Popular discussion is apt to seize on the decline in the farm population as a sign of modern decadence. In the long run such a view is quite untenable from the economic standpoint, since it is, on the contrary, an indication of economic progress. The attitude probably derives, to a large extent, from too close attention to short-run considerations, to the exclusion of the less easily understood long-run results. It has, however, also other, not wholly economic, bases. We shall return to this point later, when we discuss State intervention in agriculture.

CHAPTER VIII

THE INSTABILITY OF AGRICULTURE

§ 1. *Types of Fluctuation.* The previous chapter analysed the effects on agriculture of continuing changes in the underlying conditions of demand and supply. In this chapter we shall be concerned with the fluctuations about these trends. Most industries are subject to short period disturbances, but agriculture perhaps more than most. So far as individual products are concerned the most important price fluctuations originate in changes in the quantities sold, either seasonally, annually or cyclically. In so far as the consumers' demand for any product is inelastic, the retail price changes more than in proportion to the alteration in output, thus causing fluctuations in receipts and in income. Moreover, since the amount taken by the middlemen tends to be fairly constant per unit of product, the demand with which the producer is faced is still more inelastic, so that the producer often receives a greater aggregate amount for a small than for a large crop.

Besides fluctuations in the prices and returns for individual crops, agriculture is subject to general cycles both in prices and in prosperity which some people believe to originate in the nature of agriculture itself.

§ 2. *The Stability of Marketing Charges.* Any variation in retail prices generally results in nearly an equal

absolute change in the prices farmers receive, since the amount absorbed in the marketing process, the spread between retail and farm prices, remains almost constant whatever be the short-period fluctuation in farm prices. This is true whether the alteration comes from the side of consumers' demand or of farmers' supply. As a result farmers' prices vary proportionately far more than retail. For suppose farmers to receive, initially, 50 per cent of the retail price. If this price falls by 5 per cent from 100 to 95, then the farm price will also fall by 5, from 50 to 45, but this will mean a decline of 10 per cent, twice as great as the percentage fall in the retail price.

There are three reasons for expecting a comparative stability of marketing charges even though consumers' incomes, and hence the demand for food, fluctuate in the short period.

First, as we have found, the supply of agricultural products, taken as a whole, is inelastic, while even the output of individual products cannot be altered to any important extent except after a fairly long interval. In other words, farmers are prepared, in the short run at any rate, to accept almost any price decrease rather than sell less products. This means that there will be little or no decline in their demand for the middlemen's services, so that there may be no incentive to the latter to accept lower returns.

Secondly, even though a price decline induces farmers to sell less, there is no great inducement to distributors to accept a lower return per unit rather than a cut in the volume in which they deal. Prime costs are for them a relatively heavier item than they are for farmers, and only a few of these costs will be

reduced when their volume of sales diminishes. For this reason the supply of distributors' services will be fairly elastic, and they will accept a diminished volume of business rather than cut their margins much. This results in any price changes being passed back on to producers.

Thirdly, a considerable number of the marketing services are performed by organizations possessing, to a greater or lesser extent, monopolistic powers. Some of them, such as railways, charge rates which are fixed per unit of product for rather long periods. Others habitually charge either a fixed amount, or sometimes a fixed percentage of the price, and maintain these rates more or less rigidly, even though variations might appear to be more profitable. This power of monopolists to maintain their charges is particularly important in a period of general depression when unorganized farmers are in a weak position and will sell at any price to cover prime costs. Public opinion will sometimes not tolerate excessive profits, but will not object if middlemen avoid the natural decline in incomes which occurs when demand is falling. For this reason monopolists are able to exert their control more strongly in a depression than in a boom.

When prices fall because of an increase in supply, the margin taken by distributors tends equally to be constant. Thus for potatoes, while retail prices in Great Britain varied in the ten seasons from 1923 to 1932 from a minimum of 142s. per ton in 1929-30 to a maximum of 264s. in 1924-25, 86 per cent greater, the margin between retail and growers' prices was 97s. per ton in both years. Growers' prices had, therefore, to

vary by the same absolute amount as retail prices, from 45s. per ton to 167s., which represented a difference nearly three times the minimum price.

When supplies increase there is a greater, not smaller, demand for middlemen's services. It is perfectly true that unit costs will fall as the volume handled increases; but they will fall because overhead costs are spread over a larger volume, and overhead costs are irrelevant to the charges made in the short period. Middlemen's charges, in spite of the greater demand, will generally be fairly constant, for three reasons. First, prime costs may fall slightly as the volume dealt in increases, as some items, such as the cost of capital borrowed to hold stocks and the cost of insurance, will be proportional to the value of the product dealt in and not to its quantity, and this will be smaller per unit when the crop is large. To counter-balance this merchants, as we shall see later,¹ store some of the amount produced when weather conditions are favourable in order to sell it later when supply is short and prices higher. Thus additional costs of storage are incurred in years of heavy crops.

Secondly, a number of marketing charges are performed by agencies which do not deal wholly in agricultural products. Transport companies, banks and insurance companies base their charges in relation to the total and not merely the agricultural demand for their services, and a change in the conditions of sale of one or a few farm products will not much affect them. Thus a glut of potatoes in Lincolnshire is comparatively unimportant to British Railways.

¹ See pp. 153-4.

A general change in agricultural output in overseas countries, however, will considerably affect the demand for shipping space to Great Britain. For this reason, shipping rates may rise if the crop is very large.

Thirdly, once again, marketing charges will tend to be fairly constant owing to the habit of many monopolies of making fixed charges.

For all these reasons, any variation in demand or in output will affect mainly farmers' prices, and not the margins taken by middlemen. Fixed margins, taken in conjunction with consumers' demands which are frequently inelastic and with considerable fluctuations in supply, result in highly unstable farm incomes.

§ 3. *Seasonal Variations.* The first variation we must consider is that between different seasons of the year. There is some alteration in the demand for food ; thus beef suitable for roasting and pork are more in demand in the winter, lettuces and salad vegetables in the summer. Turkeys find a peak demand just before Christmas, and milk on Shrove Tuesday for pancake making, when the demand is about 6 per cent above normal. These peak demands, except for milk, lead to peak prices, since supply variations rarely coincide with them. Pork and turkeys, for instance, are most expensive at Christmas. On the whole, however, demand is probably more stable throughout the year than it is for industrial goods.

On the supply side the reverse is true. The output of farm products is largely affected by weather conditions and biological factors, and is thus highly seasonal, while most industrial products, with the

exception of building, are produced indoors, insulated from the effects of such factors.

There are some farm products which cannot be stored at all. Their price will then vary from season to season with the cost of producing and transporting to market the marginal unit which can be sold. This cost may differ considerably according to the time of year. Thus, for strawberries before the war, the home product fetched high prices, above 2s. per lb., to the grower when the home product from a limited number of early districts first came on the market in May. As the season progressed strawberries ripened in later and more extensive areas and prices fell steadily to about 3d. per lb. in the season of peak production towards the end of June and the beginning of July, and then rose a little again as marketing fell off. Except in this season, prices had to be enough to cover the high costs of growing in hot-houses, as much as 5s. per lb. These prices were prohibitive to most consumers.

Milk falls into the same category as strawberries, though there the variations in cost of production are much smaller. Liquid milk, again, cannot be stored, and is produced, in the Northern Hemisphere, at considerably lower cost per gallon when cows calve in the spring and reach their flush milking period when grass is plentiful in May and June, than if they calve in the autumn and have to be fed on roots and purchased foods in the succeeding winter months. Thus, under competitive conditions, milk is cheaper in spring than in winter.

Generally the seasonal variations in cost of production are less for livestock products than for crops,

since livestock output is dependent to a large extent upon grass, which is the only important crop that can be produced over a long season, or even, in some countries, all the year round.

We have stated that fresh strawberries and liquid milk cannot be stored. Most perishable products, however, can be converted to a more durable form, and there is, accordingly, no hard-and-fast dividing line between products which can and those which cannot be stored. Liquid milk can be made into cheese or condensed milk, which can be kept for some time, fresh meat can be frozen, eggs can be pickled or dried and strawberries can be made into jam.

When a product can be stored, the price position becomes rather more complicated. Producers then have the alternatives of producing in the season when costs are lowest and holding some of their produce so as to sell it at other times, or of producing, if they can, throughout the year. Now storage involves costs. First, it must postpone the time when the ultimate consumer pays for the product, and so it requires capital.¹ Secondly, special buildings and equipment are frequently needed in which to carry the product; thus wheat elevators, cold storage plants for butter or meat, and gas chambers for fruit, must be constructed and operated. Thirdly, part of the product may decay and be unsaleable after storage, as with potatoes in clamps or pits. Fourthly, the product may have to incur the costs of processing if it is to be stored, as strawberries in the form of jam, or pickled eggs. Fifthly, storage involves risks which are often considerable, in that the holder cannot be sure of the

¹ See p. 81.

future price at which he will be able to sell. Finally—though this is a difference on the demand and not on the cost side—the consumer may prefer fresh to stored products and therefore be prepared to pay a higher price for them. Thus fresh eggs command a higher price than pickled eggs, and fresh than bottled fruit.

Farm products will be stored only if the difference in price between the time of sale and the time of production is expected to cover the costs and risks. These will vary considerably from product to product, according to their perishability, their bulk, and so on. But, given the costs of storage, the degree to which it is practised will depend upon the difference in costs of production at the different times of year. When this is great, production will be concentrated at the seasons of lowest cost, and consumption during the rest of the year supplied out of stores carried over from this season.

The extreme example of this is given, of course, by crops which can only be produced for sale at all easily once a year in any climate. Prices will then be lowest at the harvest season and rise throughout the year so as to cover the cost of storage.

If, however, transport is cheap relatively to storage costs, a consuming centre may be able to draw supplies from areas with different climates, where the harvests occur at different times. Thus England buys wheat not only from the Northern Hemisphere, where it is harvested in July and August, but also from the Southern Hemisphere, whose harvesting season is about Christmas. She obtains butter not only from her own cows and those of the Baltic countries, which produce

milk most cheaply in May and June, but also from New Zealand, in which the flush season comes in the middle of the English winter. Thus there may be two or more periods of low prices at the seasons of cheapest production, with subsequent inter-seasonal price rises as the product is stored or the cost of production increased. The price of New Zealand butter in England, for instance, was highest about November, before the new season's make came on the market. It then fell sharply, rose again in March and April, declined once more a little as the home-produced and Baltic butter came on the market in large quantities, and then rose fairly steadily in price again.

So far we have described the normal price changes which must occur for products when demand is stable, the product perishable or costly to store, and nature more lavish at one season than another. In fact, as is only too well known, the actual price changes are sometimes greater and more erratic than would be accounted for wholly by these circumstances.

Firstly, it is often claimed that prices fall more after harvest, and rise more later, than is really necessary in order to cover the costs of storage. The farmer, it is argued, cannot obtain the necessary credit to enable him to postpone sales, and the middlemen take advantage of his necessity. Moreover, while storage on farms often costs practically nothing, storage by merchants invariably involves warehousing expenses, so that costs of storage are increased by the rapid transfer to merchants of the greater part of any crop. The statistical evidence indicates that this sometimes happens, but by no means always.

Secondly, there is a tendency, for some crops such

as potatoes in which the yield and hence the price vary violently from year to year, for prices at the beginning of the season not to be perfectly adjusted to the new conditions. When the crop is large the prices are too high to begin with and fall throughout the season, as it becomes increasingly obvious that they must be lower in order that the supply should be absorbed. When the crop is small, prices open too low, until, later in the season, a shortage becomes apparent. This type of price movement is the result of lack of adequate information, and is one of the reasons which has led the State to intervene in the marketing process in agriculture.

§ 4. *Annual Fluctuations.* We have already seen that the farmer cannot, to a large extent, control the output that he produces, and that yields, particularly of crops, vary from year to year according to the weather, to attacks of blight, etc.¹ The smallest fluctuation occurs for animal products and the greatest for tree products, of which the yield is not only highly susceptible to weather conditions in any year, such as the presence or absence of a late frost, but for which, also, the power of bearing fruit in the subsequent year is improved or worsened by a bad or a good crop. Thus the yield of apples in Great Britain has varied in the ten-year period from 1928 to 1937 by so much as from 73 lb. per tree in 1934 to 13 lb. in 1935.

These fluctuations in yield, since they are unexpected and so cannot be counterbalanced by varying acreages or numbers, inevitably affect prices. Prices, however, depend mainly not on the output in any one country,

but on that produced in all areas accessible to the market concerned. The larger the area the less is likely to be the proportionate fluctuation in supply. On a single farm output may vary from complete failure to a bumper crop, but it is unlikely that favourable or unfavourable conditions will synchronize in the different producing areas, when these are widely scattered, though they may well be similar in the areas which can supply such a heavy crop as potatoes to a single market.

The crop for which a world market is most developed, since it is widely demanded and easily transported, is wheat. For this product the average of the fluctuations from the average yield for the period 1927-38 was 7 per cent of the average in Great Britain, 16 per cent in the United States, 28 per cent in Canada, but only 5 per cent for the world as a whole. For such a crop the annual fluctuations in prices are naturally less than for one, like potatoes, where the market is smaller.

Although prices depend mainly upon the total crop in all accessible areas, local supplies often have a greater proportionate influence. If one area has a bumper crop compared to others, prices there will fall relatively, partly because of the cost of shipping the surplus to other areas, partly because of consumers' preferences for a variety to which they are accustomed, and partly because of imperfect competition between dealers in different areas. This effect can be seen in the fluctuations of potato prices between different districts in England.

The annual variations in yield cause prices to fluctuate to a greater or less extent according to whether demand is inelastic or elastic. The demand for animal

products is generally more elastic than for crops, though perhaps less elastic than for fruits, as they are less essential and have more substitutes. Thus, both because supply is less variable from year to year,¹ and because demand is more elastic, livestock prices will tend to fluctuate less than crop prices.

Where the product is one that can be stored from season to season the variation in annual prices may be somewhat diminished by storage, just as is the fluctuation in seasonal prices. Thus, take coffee, where a bumper crop so exhausts the trees that the next crop certainly, and probably the next two or three crops, will be small, usually about half the bumper crop. If the elasticity of consumers' demand is sufficiently low for price, without storage, to fall in the bumper year below the price to be expected in the subsequent year by more than the costs and risks of storage, merchants or producers will certainly store. As a result, prices will be higher than they otherwise would be in the bumper year and lower in the next year, when the sale of the stored stocks will be added to the sale of the small amount produced that year.

If the variation in crop yields is sufficiently great, and consumers' demand sufficiently inelastic, it may be worth while for the merchants to store a sufficiently large proportion of the bumper crop to be able to augment the short crops expected during the next two or three years and not merely the next year. The costs of storage, however, which may be about 10 per cent of the value of the amount stored per year, increase proportionately to the length of storage. Moreover, the risk is substantially increased as the

¹ See p. 103.

time of holding is lengthened. Thus, with coffee, there is little danger of a large crop in the year after a bumper crop, but, if weather conditions are favourable, another large crop sometimes comes two years, instead of the more normal three or four, after a bumper crop. The risk of holding for two or three years is, therefore, far more than twice or thrice the risk of holding for one. For this reason, although some stocks are held from year to year, storage by merchants can never prevent considerable price fluctuations, since it will only take place when price has fallen far enough to compensate for substantial costs and considerable risks.

Examples of storage of coffee under a *laissez-faire* regime, when merchants or producers do the holding, cannot be given, as, since 1907, various State-aided storage schemes have been operated. Statistics are, however, available of stores of wheat off farms. These always increase after large crops, and, in the period of free marketing, usually fell after small ones. Thus the world crops, excluding Russia, rose by 310 million bushels between 1922-3 and 1923-4, and stocks, at the end of the crop year, were increased by 120 million bushels. In the next year the crop decreased by 387 million bushels, and 158 million bushels of stocks were disposed of. Prices at Liverpool, the principal world market, fell by 12 per cent between 1922-3 and 1923-4, but rose by so much as 49 per cent between 1923-4 and 1924-5. For wheat the risk of unexpected price fluctuations is greater than for coffee, as there is no regular cycle of yields, such as that caused by the exhaustion of coffee plants, so that considerable annual price fluctuations are to be expected.

While the storage of crops cannot generally prevent the price to the producer from varying substantially, it does sometimes eliminate the more extreme fluctuations in the prices that the consumer pays. As we have seen, the margin between retail and farm prices is increased, in years of heavy crops, by the costs and risks of storing part of the supply. The amount taken off the market in such years must increase retail prices, while the sale of stored stocks in years when output is low will then lower retail prices, thus reducing fluctuations.

Annual price variations usually result in fluctuations in farmers' incomes. The actual return to the farmer, not allowing for alterations in his costs, will be greater or less for a large crop than for a small according as the elasticity of merchants' demand is greater or less than unity. For many livestock products, for which demand is elastic, he will receive more for a large output than for a small; for potatoes, with an inelastic demand, he will receive less if his output is large than if it is small. Costs, however, will be rather greater for a large crop. All the overhead costs and the costs incurred in planting and cultivating the crop will be unaffected by variations in yield, but the costs of harvesting a heavy crop will be greater than those of harvesting a light one. For this reason the elasticity of dealers' demand must be rather greater than unity, and the elasticity of consumers' demand considerably greater, if producers are to be as well off when yields are good as when they are bad. If demand is inelastic, or if it is rather elastic, producers' incomes will vary from year to year with crop yields.

§ 5. *Cyclical Fluctuations for Individual Products.*

Occasionally the annual variations in crop yields, and the consequent price fluctuations, occur in cycles of greater or less regularity. Thus, for potatoes, there is a rather definite cycle in yields of from 3 to 4 years, though in any one year the yield may differ from that expected. Irregular cycles of rather similar length are found for other products, and must be explained, in the main, by cyclical alterations in the weather.

These cycles in output and prices are unplanned, in the sense that they result from circumstances beyond the control of the farmer. They are irregular and confined almost entirely to crops. They are, however, not the only, or the most important, cycles in the production of farm products. Output may also fluctuate because the farmer plans to change the scale at which he intends to produce. Though he cannot control yields, he can modify, more or less at his own will, the acreage of crops that he plants and the number of livestock from which he breeds.

Farmers adjust the output of any commodity according to their estimates of its future profitability relatively to that of other products that they can grow. There is clear evidence that they base their decisions mainly on the conditions prevailing at the time, without regard to what may be expected to happen in the future. But it is not clear whether they react mainly to existing incomes, as represented by the difference between receipts and prime costs, or to existing prices. If demand is inelastic, incomes and prices will fluctuate together, both being high when the crop is short. Again, if prime costs are large relatively to total costs,

as they are for pig feeding, a short output will reduce total costs and is likely both to raise prices and to increase incomes. It is only when demand is elastic and prime costs small relatively to price that prices and incomes are likely to move inversely.

There is no clear evidence as to which factor most affects the farmer when they move differently. Some farmers appear to think existing incomes will be maintained, and others that existing prices will persist but that output will revert to the average amount produced, so that definite cycles in production are not very common.

For the other products, for which prices and incomes move together, most farmers decide to increase their output when price is high relatively to costs, and to decrease it when it is low. If the increasing supply resulting from these decisions appears on the market soon, any over-expansion or undue contraction will not have time to exert a cumulative effect, but can soon be reversed. Thus, with crops, the changed supply will be harvested less than a year after it was sown, and before the next crop is planted. It is true that the farmer may have already decided what he will grow in the next season; but, if the price change is large, he will be able to modify his view. In fact, the acreage of crops planted appears to respond to the prices prevailing in the harvesting season, though before the 1914-18 war farmers' decisions on this matter seem to have been taken a year earlier. Thus there is no reason to expect a cumulative cyclical movement in the acreage of individual crops, and any cyclical variation that occurs in prices will be the result of cycles of yields.

For many livestock products and for tree crops, however, the lag between the decision to increase output and the appearance on the market of the larger volume is considerably longer,¹ and the decision to increase output may often be taken at more than one time of year. For cattle the lag is nearly three years, for coffee about five years. It follows that farmers who have responded to an increased price will not discover for some time that, since other farmers have behaved in the same way, they have all increased output unduly. Other farmers, in addition, will have time to expand their output before the miscalculation becomes apparent, and the error will be cumulative.

Nor is this all. An animal can continue to breed for a number of years ; in England the average period is about three years for a pig, and above five years for a cow. Since, once bred from, it fetches a considerably lower price on slaughter, it will pay to go on breeding from stock when it would not pay to mate them for the first time. Similarly trees, once planted, go on bearing for a number of years. A coffee tree reaches its maximum yield at about ten to twelve years old, and only begins to decline substantially in yield when over twenty years old. Thus, even when the error is discovered, it can be rectified only at considerable cost.

Similarly, when prices are low, it will pay to delay mating animals for the first time. Producers will begin to contract output, just as they began to expand when prices were high ; once again, after a time during which the mistake becomes cumulative, supplies will again be low and prices high.

¹ See p. 101.

Thus a cycle of over-and-under production will be set up, self-perpetuating. The initial favourable price stimulates an increase in output. When the resulting larger supplies come on the market, price falls, farmers decide to contract output, and, again after a lag, prices rise again. The continued existence of this cycle, besides necessitating certain relationships between the elasticities of demand and supply into which we cannot enter, assumes that farmers do not learn from experience that there will be a cycle. Why they do not do so it is difficult to say; but the fact that there are cycles shows that they do not learn.

The length of the cycle will vary from product to product. For pigs the length from peak to peak is nearly four years, for sheep, which take longer to mature, from six to nine years, and for cattle in the beef-exporting countries from fifteen to eighteen years. Its intensity will also vary. The easier is it to expand output, the greater will be the fluctuation in supply. The less easily is the product absorbed in the market, the more inelastic is demand, the more will prices vary. Thus the pig cycle is particularly definite and pronounced because the number of pigs can be altered easily and at shorter intervals than a year. There is no very definite cycle in the number of cattle in Great Britain, as demand appears to be, on the whole, elastic, though there is a cycle in the exporting countries where, owing to larger marketing costs, dealers' demand is inelastic.

These fluctuations in "planned" output may produce variations in farmers' incomes, just as do the "unplanned" fluctuations. A change in planned output, however, involves a greater expansion in costs when

supply is increased, since the costs of planting or breeding, as well as the costs of harvesting, will be raised, and a greater contraction when it is decreased, than does a similar alteration in yield per unit. It follows that, if dealers' demand is elastic so that total receipts and total prime costs vary together, both increasing when output is large, the farmer's income will alter less when planned output fluctuates than it does for a corresponding alteration in unplanned output. On the other hand, if demand is inelastic, so that receipts and costs move inversely, changes in planned output will cause incomes to fluctuate by more than do equal changes in unplanned output.

§ 6. *The General Agricultural Cycle.* There is no reason to expect the peaks and depressions in the output of those farm products which show cyclical fluctuations to coincide, since the lag between price and output changes differ in length. None the less, there is clear evidence of a general cycle in agricultural prices and prosperity. It is part of the general trade cycle experienced in practically all lines of economic activity, and cannot be dissociated from it. During the period before the 1914-18 war the length of the cycle was generally about seven or eight years from peak to peak, and peaks and depressions occurred at about the same time in most countries. Since the 1914-18 war there have been peaks in 1920, in 1929 in many countries but not in Great Britain, and in 1937 in most countries. Deep depressions reached their lowest point about 1921 or 1922, and in 1932 or 1933.

It is beyond the scope of this book to discuss the causes or course of the trade cycle. We cannot,

however, dismiss it entirely, for there can be little doubt that the immediate prosperity of agriculture is more closely related to the position of the trade cycle than to any other factor.

Some authors, indeed, have seen in the movements of agricultural output the chief cause, or at least the initiating impulse, of the cycle. They have traced a relationship between the variations in the yield of crops and subsequent prosperity or depression, and endeavoured, not with complete success, to explain the differences in yield by weather cycles. A good crop stimulates trade, a bad crop hampers it.

One of the objections to this theory is that the crop cycles appear to be about $3\frac{1}{2}$ years in length, not 6 or 7. It is suggested, however, that good harvests only succeed in stimulating activity when other factors are also favourable, and that this does not always happen. A second objection is that good crops may actually decrease farmers' incomes, if the elasticity of demand is low, as it probably is for all crops taken together. It is true that food will then be cheap, but it is doubtful whether cheap food will encourage trade in the short run. There will certainly be an increased demand for transport, etc., and, in so far as farm products are a raw material of industry, costs will be reduced and output increased. But, as we have seen, agricultural products are comparatively unimportant as industrial raw materials.¹ It has been estimated that, in the United States, the value of agricultural produce used in manufacture is probably about one-fifth of the total value of the output.

The controversy is still unsettled and cannot be

¹ See p. 8.

argued fully here ; there are now comparatively few people who would claim that fluctuations in the yield of crops explain the whole trade cycle.

Whether or not the cycle is caused by the behaviour of agricultural output, it certainly affects farmers. Its most important aspect is the fluctuation in money incomes, a variation both in rates of pay and in numbers employed. Between 1927-9 and 1933, for instance, the national income in Great Britain, in terms of money, fell by 11 per cent, and between 1933 and 1937 rose again by 29 per cent. In the United States the variations were even more violent, as the national income fell by 42 per cent in the first period and rose by 50 per cent in the second. This represents a very substantial fluctuation in money demand, which had its obvious effect on the demand for food.

Since marketing costs are relatively rigid, the demand for agricultural products on the farm changed even more than the retail demand for food. Moreover, the decline was greatest where the costs of marketing were largest. This occurred where the product had to be transported long distances, from Australasia or South America to England.

The demand for food, however, probably fluctuates less than the demand for industrial products in times of depression or boom. Firstly, when incomes decline, food consumption is the last to be cut down. Secondly, foodstuffs are not only necessities, they are also perishable, and their purchase cannot be accelerated or postponed as the purchaser's circumstances change. If people find their incomes diminished, they can put off buying clothes or repairing their houses for some time, but they must go on buying food. Thus the demand

for food will fall off less rapidly than that for other things as incomes begin to drop. It will also increase less rapidly as incomes recover, since there will be no leeway to be made up in food purchases, as there will be for clothes.

While demand fluctuations are usually greater in industry than in agriculture, they are partly countered there by alterations in supply. In agriculture, as we have seen, supply responds doubtfully to price changes, and in peasant countries a fall in price may actually increase supplies. As a result, a decline in demand results in far greater price changes for agriculture than for industry. The cycle becomes a cycle, not in output as it does in industry, but predominantly in prices and in profits.

There can be no doubt that farmers are worse off because their supply does not respond to short-period price changes as does industrial supply. If their output fell in depressions, they would obtain a greater share of the available income, but the community would suffer owing to the resultant fall in real incomes. The trouble in a depression is that industrial output is contracted, not that agricultural output is maintained.

CHAPTER IX

STATE INTERVENTION IN AGRICULTURE

§ 1. *Reasons for Intervention.* Much of the analysis in the preceding chapters has been based on the assumption that farmers work and sell their products under conditions of free competition, modified only by a small degree of monopoly, and occasionally by the co-operative association of farmers or consumers in marketing. We have ignored any measures which may be taken by the State to interfere with or assist in the processes of production or selling. In fact, however, the State has always intervened to a certain extent in agriculture; in the years just before the recent war its intervention had become so important in almost all countries as to constitute a major factor in agricultural development; and during and since the war it is hardly an exaggeration to say that State action has dominated the market situation.

Some of the reasons which led many Governments before the war to devote special attention to farming still operate, though others have ceased to be important. They arose partly from the differences between agriculture and industry which we have already emphasized. Firstly, agriculture is peculiarly dependent upon the land, and the systems of land tenure and of inheritance, both of which are of fundamental importance, must be, in part at least, determined by the State. Secondly, farming is predominantly a small-scale industry

which hampers the farmer in organizing services in production available to large scale undertakings, makes it difficult for him to obtain the necessary capital and puts him at a disadvantage in bargaining with large-scale middlemen. Thirdly, agriculture, almost throughout the world, has been a relatively depressed industry, because rising efficiency and standards of living required a smaller proportion of the population to produce necessities, including food, and because factors of production were slow to move out of agriculture. Fourthly, agricultural prices and profits fluctuated particularly violently, as supply did not adjust itself to demand in the short run. Finally, various social and political factors were often assumed to warrant special treatment for farming.

Some of these reasons for intervention still operate after the second World War. Agriculture is still peculiarly dependent on the land and most farms are still small. In the absence of any control, prices and profits would also still fluctuate violently, probably more violently than before the war. But, for the present at least, more and not less resources are required in agriculture, at any rate outside America. The war has greatly reduced food production in Europe and the Orient ; but world population is still increasing rapidly, and employment is good. Food prices have risen more than the prices of manufactured goods and considerable supplies have to be obtained from America. Europe obtains these to a considerable extent as gifts under Marshall Aid, since it cannot at present produce enough exports that America wants to pay for them.

Food production in this country, expanded when

imports could not be obtained during the war, is still substantially greater than pre-war. There seems general agreement that a larger agriculture than pre-war will be permanently needed here, and possibly one larger than at present. World food prices may fall as European and Oriental production recovers ; but world population is still increasing, many countries are developing industries and employment is far better than before the war ; so that in all probability food prices will remain higher relatively to other prices than between the wars. Moreover, since this country has disposed of many of its overseas assets, it can no longer pay for a substantial proportion of its imports out of the interest it receives on overseas investments. Consequently it has to force its exports into new markets, possibly at a price sacrifice.

It seems likely, then, that State intervention will no longer be required in this country because market forces make agriculture a relatively depressed industry. But, instead, it may be needed to get the required expansion in output quickly.

That leads on to the central reason for Government intervention during and since the war. The great increase in money incomes, at a time when supplies of consumable goods on which to spend them were reduced, necessitated control of prices to prevent inflation, subsidies on necessities to keep down the cost of living, and control of supplies and rationing to ensure fair distribution.

This concluding chapter will outline briefly the economic justification for various general types of State intervention, and will try to show the economic objections to other forms of action which have com-

monly been adopted by Governments, for reasons which are only partly economic. It will concentrate largely on the type of Government intervention that may be expected at a time when prices are so adjusted that aggregate demand, unrationed, will be no more than available supplies. But some mention will be made of the more far reaching controls which become necessary when prices are kept below this level. It can be no more than a general outline. An analysis of the agricultural policy of even one State would need a book, not a chapter, and different States have adopted different methods.

§ 2. *State Intervention in Production.* The first way in which the State can intervene in agriculture is by measures designed to improve the efficiency of production on the farm itself.

State policy must affect the diffusion of landed property and the extent of landowners' control over farming. We cannot discuss here the merits of different policies towards the ownership of property and its inheritance; but we must note briefly their effect on agriculture. The State may, in order to diffuse the ownership of property, encourage the widest possible distribution of land ownership and find itself faced with the problem of uneconomically small farms, and the necessity of devising an adequate method of providing farmers with capital.¹ Or, as was true in Germany, it may entail some land and prohibit its sale or mortgage, so as to prevent the breaking up of farms. Or it may permit, or even encourage, the growth of large estates whose owners rent their land

¹ See p. 72.

to farmers, and concentrate its attention on evolving a system of land tenure which will provide the tenant with security of tenure and freedom of enterprise, and yet give the landlord some protection for the capital he has invested in the soil, and some power of ejecting a bad tenant. This has been the aim of policy in England, but it is not easy to reconcile the two objectives. Policy has tended to emphasize more and more the first objective, security of tenure.

When there are large estates the provision of a considerable part of the necessary capital is taken over by the landlord, often at a low rate of interest,¹ while farms approximate more nearly to the most economical size than they generally do under a system of owner-occupiership. On the other hand, the long-term capital of the estate may be depleted by a number of causes extraneous to the efficiency of its farms, such as the taxation levied on the death of the owner, or his spendthrift or charitable nature. Moreover, the landlord may be either absentee or ignorant, so that he cannot supervise the running of the estate.

In addition, both the system of owner-occupiership and that of landlord and tenant suffer from two defects. First, the productive power of the soil is by no means always indestructible, and it is possible greatly to diminish it by growing unsuitable crops. Private owners are apt not to look far into the future ; thus the farmers of parts of the Middle-West of America ploughed up land and planted it to wheat in areas so arid that, in a drought year, all the good soil blew away and the land became almost desert. If it had been left under buffalo grass, moisture would have been

¹ See p. 67.

conserved and cattle could have continued to graze there. Secondly, owners of land, both agricultural and otherwise, obtain an unearned increment in value if the development of a nearby city or the improvement of transport increase the demand for their land. It is very improbable that this increment of income will be distributed according to need.

Recent legislation in this country is designed to reduce these various defects. First, under the Agriculture Act of 1947 both landlords and tenants may be dispossessed (with compensation and after the possibility of appeal) if, after a period of supervision,¹ they continue to flout rather vaguely stated "rules of good estate management" and of "good husbandry." It is unlikely that these provisions of the Act will often be used; they are only designed to meet extreme cases. Secondly, under the Town and Country Planning Act, the community and not the owner is to benefit when land is changed from one use to another, though not when circumstances outside the action of the owner cause it to yield a larger profit in its existing use.

It has been suggested that these difficulties can only be more fully surmounted if the State itself takes over the ownership of land. If land were nationalized, ownership would be continuous, full time professional managers could supervise large blocks, and efforts could be made to establish farms of the most efficient size. In addition, the State could take a long-time view of the conservation of the soil and would itself obtain any increments in land values.

The arguments put forward against land nationalization are, first, that it would prevent people obtaining

¹ See p. 173.

the satisfaction of land ownership, and thus eliminate both a source of cheap capital to farmers and a real element of happiness. Secondly, it is argued that delegated management is often less efficient than control by the owner. Thirdly, it is suggested that the State is very unlikely, in fact, to be swayed by economic motives in deciding the size of farms, but is far more likely to make them smaller rather than larger than they are at present, by adopting an un-economic policy of smallholdings.

We cannot, after such brief consideration, attempt to weigh these arguments one against the other, or to suggest what form of land ownership is best under all circumstances. The arguments in favour of nationalization have been strengthened by the decline in the wealth of the land-owning class, largely owing to taxation, and by the rapid break-up of estates, and the supply of cheap capital to farming has been reduced by the same tendency. They would also be strengthened if agriculture were to be permanently assisted by any of the methods discussed later in this chapter. For part of any benefit given would go to the owner of the land, and there appears to be no special reason why the State should subsidize landlords.

The State may be able to improve farming efficiency by other means than by regulating the system of land ownership.

First, some measures for increasing efficiency may only be effective if they cover the whole of an area, and thus only practicable for an authority, national or local, possessing compulsory powers over all producers there. It is almost useless, to take an example, for an individual farmer to attempt to fight such an

infectious disease as foot-and-mouth, since, if his neighbours do not act as he does, all his precautions are valueless. Similarly, a field drainage scheme on one farm may be valueless if a neighbouring farmer allows his land to become waterlogged and his drains congested. In these spheres the State can usually intervene to make all farmers in an area conform to regulations designed in the interests of all.

Secondly, since farmers cannot be expected to take as long a view as the State, assistance is needed for activities whose results do not appear for a long time, such as the agricultural education of would-be farmers, research into agricultural problems and the dissemination of its results, and sometimes long-term schemes for drainage or the application of fertilizers.

Thirdly, there may be services connected with production which cannot, or can only at undue expense, be undertaken on a small scale, and which the farmer, whether because he is immersed in his day-to-day business or because he is too individualistic in outlook, is not prepared to join with others in providing, and for which private contractors charge too high a fee. In this category may come the provision of farm machinery, the purchase of requisites such as fertilizers and feedingstuffs at bulk prices, and the organization of societies for pledging producers' joint credit so as to obtain capital on cheaper terms. The State may either provide these services itself, as has this country during and since the war for much farm machinery; or, as in Denmark, it may encourage and assist Co-operative Societies to supply them.

Fourthly, there may be reason to suppose that, through ignorance, the bulk of farmers are failing to

use as fully as desirable some method of production. This was the justification for the pre-war subsidy on the use of lime and basic slag. (It should perhaps be pointed out that the existing subsidies on feeding-stuffs are granted on entirely different grounds with the idea of stopping inflation.)¹ Closely related to this is State intervention to increase the output of some particular crop. Sometimes, as is probably true for long leys, it is thought that farmers do not fully realize the superior productiveness of this product over the alternatives; sometimes the prices fixed for two products, for example wheat and barley during the war, may give an undesired advantage to the production of the crop the less required, and intervention be required to correct this. We shall return to this point when we discuss State action designed to divert resources from one use to another.²

Finally, the State or its local representatives may step in when there is reason to believe that specific farmers or specific landowners are failing to pursue what it considers to be efficient methods. Such intervention is specially required either when maximum production is vitally necessary or when prices are so favourable that even inefficient farmers can remain in business. Often these two conditions go together, as they did during the recent war and do in the immediate post-war period. In the war intervention was legalized under the Defence Regulations; now the Agriculture Act of 1947 gives County Agricultural Executive Committees powers to try to enforce on landowners and farmers "the rules of good estate management and good husbandry." In general, directions as to what

¹ See p. 197.

² See p. 177.

to do may only be given when the owner or farmer has been placed under supervision, which probably will only be done for flagrant inefficiency. As already mentioned, owners or farmers whose methods do not improve satisfactorily during supervision may be dispossessed.¹

We have not discussed farming undertaken by the State itself as a method of increasing efficiency on the farm. As we have seen, the most efficient size of farm is generally rather small, and individual initiative is important. Nationalization of farm operations is therefore unlikely to reduce costs, except perhaps in very backward countries. This does not, of course, mean that the State should not operate or finance experimental or demonstration farms. Indeed it may be highly desirable that it should do so as part of its programme of research and education.

This discussion on State intervention in production may be summed up by posing two questions which must be answered before deciding on the desirability of such intervention. First, do deficiencies in the organization of production persist where the individual farmer is not assisted? Secondly, can the State, or a Co-operative Society helped by the State, reasonably expect to remedy these deficiencies at a cost which will be less than the economies obtained? It need scarcely be pointed out that these considerations, simple though they be in theory, are extremely difficult to measure in practice.

§ 3. *Intervention in Marketing.* The same general considerations apply in normal times in the sphere

¹ See p. 169.

of marketing as in that of production. If the State can intervene to lower costs, then it is desirable that it should do so. Such interference will benefit the farmer, since a reduction in marketing costs, by decreasing the amount which must be deducted from what the consumer pays, will allow the retailer to reduce prices and so increase the demand for farm products.

We have already seen that retail distribution is often unduly expensive, as each shop tends to be too small for an economic turn-over, and services unnecessarily costly. This is not confined to the retailing of farm products but is general throughout the field of retail distribution. Many suggestions have been put forward for remedying it, ranging from the provision of more adequate information on prices or assistance to Co-operative Marketing Organizations¹ to a system of zoning the areas which shops may serve and fixing maximum prices, and even to the taking over of retail distribution by the State or the municipality. During the war some of these measures were introduced to a limited extent. The retailing of milk was zoned in some towns and services simplified; maximum margins were imposed for the distribution of many farm products. But a discussion of the advantages and difficulties of these various measures falls outside the scope of this book.

At earlier stages in distribution costs may also be excessive owing to imperfect competition. Thus one large slaughterhouse for each district may well operate more cheaply than many small ones, partly because it can make proper use of by-products; but competition has not resulted in such slaughterhouses being

¹ See pp. 90-7.

established. At these stages, however, State interference may be justified as often because profits are too high as because costs are excessive. The operating units in the wholesale trade and in many branches of food manufacture are probably generally sufficiently big to attain the greater part of the economies open to large-scale business, so that the State can rarely undertake services for them more cheaply than they can perform them themselves. Not infrequently, however, they are sufficiently powerful to be able to act in a monopolistic fashion towards producers and consumers, so that the problem with which the State is faced is how to control their profits.

Two chief methods have been adopted in normal times. Firstly, in many countries, Governments have encouraged Co-operative Marketing Associations in order to put producers on a bargaining equality with distributors. In some countries such producers' organizations have been given compulsory powers over recalcitrant minorities. Thus, in England, farmers have been permitted since 1931, if two-thirds of those producing any product so desire, to set up Agricultural Marketing Boards, with powers of fixing prices for all producers, those unwilling as well as those willing. Undoubtedly one of the motives for these measures was to improve producers' bargaining power in relation to distributors; it was also hoped that organized producers might force on distributors some of the potential economies mentioned above; as we shall see later, however, these were not the only aims. Secondly, direct efforts have been made to prevent monopolistic and restrictive practices which operate against the public interest. Different countries have

passed different laws with this aim. In this country the Monopolies and Restrictive Practices Act of 1948 was introduced for this purpose. Once again, such measures have been general in scope, and not primarily agricultural, and cannot be discussed here.

Finally, for normal times, the State has often prescribed standards of quality for various grades of produce, so that consumers can know what they are getting and pass back their preferences to producers.¹

Under wartime conditions, however, far more drastic State intervention in marketing became necessary. As we have already indicated, supplies were inadequate to provide the quantities consumers wished to buy without price increases which would have led to inflation. Consequently rationing, particularly of necessities such as food, was introduced to ensure fair distribution. This involved the central control of supply and its direction to meet the rationed demand ; and even where food was not rationed it was generally necessary to control its distribution throughout the country. The more important foodstuffs were bought by the Ministry of Food, which also contracted for overseas supplies, often on long-term contracts. Existing traders were used, but often as agents of the Ministry of Food. It is beyond the scope of this book to describe this control or analyse its effectiveness.

§ 4. *The Diversion of Resources.* The normal mechanism by which resources are driven out of agriculture into other occupations when consumers' demand requires this, or new resources brought in when a relative expansion is wanted, is by price

¹ See pp. 93-4.

movements which make farming relatively unattractive or attractive as the case may be to employers, workers and capital. This transference is, however, slow ; and when a relative decline in farming is required, as was the case from about 1875 until the recent war with the exception of the period of the 1914-18 war, it leaves the agricultural section of the community perpetually worse off than the rest of the community. If the State were merely to remove the income difference without providing some alternative mechanism for transferring resources, it would freeze the existing structure and prevent consumers from realizing to the full the advantages of improving technique. There can be little doubt that agriculturists as well as industrialists would, in the long run, suffer from such a policy.

Thus, State intervention may be desirable even in normal times to accelerate the transfer of factors of production between agriculture and industry, and within agriculture. When demand exceeds supply and prices are controlled, intervention becomes even more necessary. It should be the aim of the State so to fix the prices farmers receive for each product as to encourage particularly the production of those food-stuffs most required. This necessity impressed itself more and more on those responsible for controlling prices during the recent war ; and it is still important. But, even if political pressure and the interests of established producers of different sorts are disregarded, which in practice is very difficult, it is never practicable to fix all prices in this manner. Consumers' prices can only be effectively limited if the product is rationed and supply fully controlled centrally.

This is expensive and difficult and generally only achieved for necessities. Consequently the prices of less necessary foodstuffs rise, legally or on the black market, and they become relatively profitable. Necessities can be subsidized, as they were and are, and producers and distributors between them receive more than consumers pay. But to make necessities as profitable to produce as foodstuffs less firmly controlled stimulates the inflation which price control is designed to prevent. Consequently more direct State action may be needed to secure the required production of the most important foods.

A Government may urge producers to expand or contract the output of particular foods and take steps to provide information on possible alternative occupations ; or it may offer more direct assistance to movement, or hamper production where a contraction is required ; or, in extreme cases, it may limit or prohibit the production of some thing, or instruct farmers to produce another.

Thus, in so far as what is required is a transference of resources from one agricultural product to another, some Government sponsored organization can suggest ways of modifying farmers' cropping practices so as to introduce products for which demand is expanding, and can organize research directed towards breeding varieties of the required products which can be grown in areas hitherto concentrating on products for which demand is contracting. In this category fall attempts before the war to introduce citrus fruits into the West Indian Islands, which concentrate on sugar production, or market gardening and dairying into parts of the American cotton belt. During the war, and later,

propaganda was also used ; for instance, farmers were urged to expand production in general, were told which were the preferred crops and the animal products most needed, and were asked to make themselves self-sufficient in providing their animals with feed. More powerful inducements were, however, also used.

The second group of measures, assistance or deterrents, were also used before the war. Thus the Agricultural Adjustment Administration in the United States paid farmers to reduce the acreage of those crops or the numbers of those types of livestock which were believed to be in excessive supply. The assumption behind such payments was that farmers would switch to other products more in demand ; if they merely produced less of the original product, the policy becomes one of the restriction of production, which is discussed later. In so far as farmers intensified production on the reduced acreage, as happened to a certain extent in the United States, the policy becomes abortive and even adds to costs.

Again, attempts have occasionally been made to assist workers to move from agriculture to industry. The State can help by facilitating daily journeys from country homes to town work, by assisting industries to set up where there is a surplus of agricultural labour, and by educating farm workers in industrial methods.

Much stronger methods were used during the war. In Great Britain the State made grants, beginning just before the war, for the ploughing up of permanent grassland, and later paid subsidies on each acre planted to wheat and potatoes. In addition farmers who produced preferred animal products or crops received priority in the allocation of feedingstuffs and fertilizers.

Further, farmers and farm workers were to a large extent reserved from the armed Forces. None of these methods, except perhaps the last, secure just the right transference of resources; but, if price inducements are wrong, some alternative method is indispensable.

Even the last most drastic type of method, direct instructions to farmers or farm workers as to what to do, were used during the war. Farmers were instructed by the County War Agricultural Executive Committee as to how much of certain crops, notably wheat and potatoes, they were to grow, and how much grassland to plough up. They were compelled to sell all their good quality wheat and, later, their barley for human consumption rather than feed it to their animals. Workers were prevented from leaving agriculture and occasionally persons were directed into farming. These measures, again, are open to objection in that they inevitably cannot take fully into account varying personal capacities and productive circumstances; and they detract from personal initiative and personal choice. They are thus unsuitable as a permanent element of policy in a democratic country.

If relative earnings in different lines of production, of those who manage the businesses or provide capital or labour, are wrong, it is inevitably difficult and generally impossible to secure that transference of resources which the public interest requires. In normal times the more direct methods of State intervention we have mentioned were designed to speed up a transference already under way because of differences in earnings. So long as entrepreneurs, workers and capital are free to move where they like, the main way to attract them from occupation to occupation

must be a difference in relative earnings. Other methods must remain subsidiary.

§ 5. *The Stabilization of Prices or Incomes.* It is beyond the scope of this book to deal with general State action designed to iron out the fluctuations in general employment and income, though these are certainly the most important means of maintaining agricultural employment.¹ We shall be concerned only with action designed to modify farmers' incomes, either through affecting the amount they offer, or through subsidies and levies. These measures may affect the general level of employment.²

The State may intervene to modify farmers' receipts with two objectives ; it may aim at reducing fluctuations in prices or incomes while preserving the same average, or it may aim at raising the average. In practice the two policies are apt to merge since those ostensibly designed to stabilize prices frequently attempt to raise them when they are low without reducing them when they are high, and thus increase the average level.

This section will deal with methods of stabilizing the prices of farm products individually or generally, or the incomes received from them, while attempts to raise them will be analysed when we describe various possible methods of protecting agriculture. We shall begin by assuming that farmers receive what the consumer pays for any food, less marketing charges; we shall then go on to consider what differences are made if the State is prepared to inject subsidies or make levies so as to divorce producers' and consumers'

¹ See p. 162.

² See p. 163.

prices. If there are no subsidies or levies, producers' prices can only be stabilized by putting supplies on the market at a more regular rate. Attempts to remove part of a large output from the market, without increasing supplies later on, inevitably involve higher average prices.

Unnecessary fluctuations in the prices of individual products are undesirable both for producers and for consumers, particularly if they lead, as they usually do, to variations in farmers' intended output. Fluctuations in line with alterations in costs of production are, however, not unnecessary. The function of price is to ration available supplies of goods between would-be buyers, and to allocate the various factors of production to those goods which are most demanded. If any product costs more to produce at some times than at others, it is economically desirable that it should be more expensive at such times. Prices may vary, however, partly because of ignorance of the true situation, and, in so far as this is so, the State is justified in intervening if it can take a better and longer view than producers or merchants.

Such intervention may take two main forms. First, the State may collect and publicize information on the true situation; secondly, it may assist schemes for carrying over surpluses from large crops; all other methods involve the raising of prices.

Undue price fluctuations often occur, particularly seasonally and cyclically, because producers do not realize fully the underlying conditions of demand and supply. The State, or some organized body representative of producers, can sometimes collect enough statistical information to illuminate the true position

and can publish it. Thus, if producers do not realize the necessary readjustment of prices at the beginning of a crop season,¹ an organized body may publicly state its conviction that prices are incorrectly adjusted to the true situation, and urge producers either to hold their product for higher prices, if it thinks prices are too low, or, alternatively, to sell at once, if it thinks they are too high. Such bodies, in fact, have frequently advised producers that prices are too low. Thus the Potato Marketing Board in Great Britain has, in several years, decided that prices were unduly depressed after harvest, and has urged producers to hold for a rise. But the opposite advice, also needed on occasion, is rarely if ever given, since few organized bodies are willing to tell their members that they are receiving a higher price than is really justified.

Again, cyclical fluctuations in numbers of livestock or acreages of tree crops planted are mainly due to miscalculations on the part of farmers, each ignorant of the others' actions.² One might expect that the spread of knowledge of what had happened in the past and of information on numbers of young livestock or of plantings would correct such constant errors in the future. Once again there is room for State action, though experience has shown that too much cannot be expected from such educational efforts.

It is not enough, alone, to inform farmers of the true position. If the product is not perishable, they must also be assisted to store more of it when prices are unduly low, or the State must undertake storage for them. One of the greatest obstacles to storage on

¹ See p. 151.

² See pp. 150-9.

farms is the difficulty farmers find in obtaining credit.¹ If the State or a producers' organization were to devise an adequate system of credit, it is fairly certain, for instance, that the post-harvest glut and undue price depression would be eliminated.² If, none the less, a smaller amount is stored at glut periods than appears desirable, the State or a farmers' organization may itself buy up and store the product. Thus the British Potato Marketing Board, finding advice not enough, bought up potatoes in the winter of 1937-8 for re-sale later and made a profit on the transaction.

This policy, also, is the basis of valorization schemes designed to diminish annual fluctuations in prices. As we have seen, merchants generally store part of the bumper crop of non-perishable products subject to widely variable yields. They carry over too little, however, to prevent substantial variations in prices paid to producers, since the costs of storage, and the risks of prices being different at the end of the period of storage from those expected, require a rather large price differential before merchants will store.³

If the State or organized producers do the storing themselves, they cannot avoid the real expenses and risks involved, so that an absolute stability of prices is not desirable. It is possible, however, that one organized body can bear these costs more cheaply than a number of smaller merchants. It may be able to arrange for storage to be undertaken on farms or producers' premises, where rents, building costs, etc., are less than in the cities where the merchants generally have their premises. Moreover, a large organization will generally be able to borrow at a cheaper rate of

¹ See p. 61.

² See p. 150.

³ See pp. 153-5.

interest than competing merchants. It is also possible that the State may be able to take a longer view than individuals and so assess the risks of storage at a lesser figure. Finally, if the stores are controlled by one body, it will hold a more direct and active control of market supply. These advantages justify the State in undertaking or assisting some storage of primary commodities, so that a greater proportion of a bumper crop will be carried over than would be if it were left to merchants.

All these methods can theoretically be used to stabilize prices without raising the average level, provided the authorities carrying them out are better informed than, and sufficiently resistant to pressure from, producers, really to adjust supply to demand. It is very doubtful, however, how far these conditions are fulfilled in practice, especially when the responsible authorities are representative of producers alone. Experience has shown that such bodies are very unwilling to recognize that the underlying conditions require lower prices, and are apt to interpret every decline as a temporary one, even though in fact it may be due to permanent changes, such as a reduction in costs of production. Such mistakes lead either to an unjustified increase in production and a greater price fall than would otherwise have been necessary, or, if the amount produced is controlled, to the exploitation of consumers—a point to which we shall return later.

One of the object-lessons in this matter was provided by the Canadian Wheat Pools, set up mainly in order to prevent unnecessary seasonal variations in prices. Each year they took an unduly favourable view of

what prices should prevail, so that surpluses mounted up until the final catastrophe came when, failing to realize that the bumper crop of 1928 necessitated a sharp fall in prices, they held for a rise later in the season and largely lost their market.

Sometimes a scheme may break down partly because of bad luck. Thus the valorization scheme for Brazilian coffee, after successfully disposing during the next three years of the amount stored from the 1923 bumper crop, collapsed completely when the 1927 bumper crop, of which a large proportion had been stored, was unexpectedly succeeded by another bumper crop in 1929. Yet this scheme, also, had injudiciously stimulated over-planting by advancing too much to producers on their bumper crop, so that a collapse was in any case likely to occur soon.

It is, in fact, almost impossible to find examples of price stabilization schemes which have not also become price-raising schemes. Thus the Pigs Marketing Scheme in Great Britain and the Rubber Control Scheme in Malaya, advertised as stabilization schemes, both raised prices above the long term normal under competitive conditions. Such schemes have usually involved monopolistic powers and these, once given, are rarely used entirely for stabilizing purposes.

This is a reason for entrusting price stabilization measures to independent bodies, not producers' organizations representing sectional interests only. Such bodies, it may be hoped, will have more regard for the general interest. This is a point which is taken into account in the new proposals for international rules governing the regulation of trade and employment.

The preceding paragraphs have dealt with stabilization measures on the assumption that no subsidies are injected or levies paid so as to divorce retail prices from the prices paid to producers. Such subsidies or levies, if they are to be general, involve State intervention. If farmers' prices are to be guaranteed, sales must be canalized through some central body which sells to distributors at one price and pays producers a different price, higher at times when it is desired to increase their incomes, lower at other times to make up the losses then incurred. (For we are at present only discussing measures for stabilizing incomes, not measures for raising them.) Such centralization of purchase may sometimes be desirable in order to increase the efficiency of marketing ; but not always ; sometimes, and probably frequently, it is likely to add to the costs of distribution.

Theoretically, however, it should be possible to increase farmers' incomes at some periods and decrease them at others by paying them a fixed subsidy per unit sold at some times and charging them a fixed levy at others. This would involve only a record of sales, not their central control, and would permit variations in individual farmers' returns. No real difficulty exists in paying the subsidies if records can be obtained ; this was done before the war for wheat and cattle producers. But, no doubt, it would be difficult to collect the levies. Thus this method, like most others, can more easily be used to raise farmers' average returns than to stabilize them. Or farmers could be paid or charged on their acreage of each crop or the number of their livestock. Here levies would be easier to assess, though perhaps not

easier to collect. We shall return to the relative merits of these various methods when we discuss the protection of agriculture.¹

If the administrative difficulties can be overcome the possibility of subsidies and levies extends the field in which State action designed to stabilize farmers' returns may be desirable. For then the way is open to keep up farmers' incomes in times of depression without raising the prices of the foods they supply, while reducing them in times of boom without lowering consumers' prices.

They can then be used to help stabilize not only farmers' incomes but also the general level of employment. For without subsidies a policy designed to keep up farm incomes in a period of depression necessitates limiting supplies when demand is low. This is likely to make the trade cycle more, and not less, serious. Since the chief objection to the cycle is that in times of depression the national income of goods and services is decreased, it is hardly likely that a further reduction in output will improve the situation. More consumption, not less, is wanted. Therefore, while efforts to increase farm incomes without limiting supplies may easily be helpful, the restriction of total agricultural output is likely to do nothing but harm. The only real exception, to which we shall refer later, is for an agricultural exporting country whose whole national income may be cut down owing to a temporary over-supply, and which cannot be assisted by subsidies from people not so affected, as they are all in other countries and outside the jurisdiction of its taxing authority.

¹ See p. 197.

If farmers' incomes from all products are kept up by subsidy in times of depression and the money recovered in times of boom, then total demand will be more stable and no additional resources will, over the average of good and bad times, be attracted into agriculture. Moreover, since agricultural supply as a whole is inelastic in the short run,¹ it is unlikely that agricultural output will be stimulated much in depressions by such a policy, or checked in booms. Thus such a policy should be helpful.

But it is difficult, or even impossible, to subsidize and tax all products. The administrative difficulties in many cases are too great. Thus it is difficult to get even a record of fruit and vegetable production. If only some products are subsidized and taxed, relative production will be affected, since farmers can fairly easily vary the proportion of their acreage they devote to different crops, the amount of feed they give to different animals and even their breeding policy for animals with a short period of gestation and of reaching maturity.² This limits the efficacy of such a policy.

Subsidies and levies, where they are practicable administratively, may also be useful to iron out the extreme fluctuations of farmers' net incomes from crops where output varies greatly from year to year, so as to stabilize future plantings, or to mitigate fluctuations such as that of the pre-war pig cycle.³

§ 6. *The Protection of Agriculture.* In the preceding paragraphs we suggested some ways in which the State, or, occasionally producers' organizations, can

¹ See pp. 104-115.

² See pp. 116-8.

³ See pp. 156-9.

intervene in the competitive process of agricultural production and sale to the advantage of the community. We distinguished there, and shall continue to do so, between intervention in normal times, when consumers are able to buy all they can afford at unsubsidized prices, and the wartime and post-war situation when they were not so able.

In this section and the next four we shall confine ourselves to normal times. The types of intervention we have so far found to be desirable at such times are many, but most of them not on a very large scale. There are ways in which the State can hope to lower costs of production and marketing, there are measures which it can take to facilitate the transfer of labour, and there are occasions when well-informed and restrained State action can stabilize prices, seasonally, annually or cyclically. These occasions occur far more frequently if subsidies can be paid and levies made so as to divorce the prices farmers receive from those consumers pay ; but this is often difficult to do without adding to the costs of distribution.

The reader may well be asking himself what relationship these somewhat unimpressive measures bear to the far-reaching and ambitious schemes introduced in many countries before the war for the assistance of agriculture. Does the economist unhesitatingly condemn such schemes, except in so far as they perform the tasks we have already commended ?

Such measures may have various justifications. Firstly, as we have seen, to subsidize farm incomes as a whole in times of depression will diminish the fluctuations in money incomes. It may well be desirable to do this even though it is politically and administra-

tively impossible to recover the money so spent by levies in times of boom.

Secondly, when subsidies cannot be used, it may be desirable to permit other methods of raising farm incomes when market conditions would cause them to fall very far. Agricultural producers in many parts of the world are very poor compared with those who consume their products. Hence, if the better measures to assist them are politically unattainable, it may, occasionally, be better to use inferior methods rather than none at all.

Thirdly, to keep up farmers' returns for some individual products when they would otherwise be very low, without reducing them later, may prevent some of the fluctuations in individual prices and output, though only by raising the average income of the farmer and lowering those of the rest of the community. It is quite possible that the consumer would prefer to pay a slightly higher total amount for a reasonably stable supply.

Fourthly, some schemes of assistance may benefit a part of the world, even though they diminish the total income of the whole. A Government of one nation will generally consider itself justified in adopting measures which raise the incomes of its own citizens, even though they decrease by a greater amount the incomes of the citizens of other nations.

Fifthly, it may be thought desirable to expand home food production either because the Government fears a world food shortage later, or a shortage of means of paying for imports or of shipping for bringing them in. Such a danger is most likely to materialize in time of war. We cannot enter here into the relative

merits of a greater home output of farm products, of the storage of foodstuffs and of encouragement of shipping as methods of securing food supplies in time of war. Nor can we examine the relative importance of stimulating food production rather than those engineering and other industries which provide the basis for munitions production in war time.

Finally, a number of non-economic reasons are frequently put forward justifying special assistance to agriculture designed to keep up the number of people working on the land. It is urged that workers in agriculture are healthier than those in industry, and that, in highly industrialized countries, there are social advantages in having a considerable proportion of the population working on the land. The economist, as such, cannot pronounce upon these so-called advantages, but can only show the economic consequences of actions designed to achieve them.

For all these reasons special assistance is often given to agriculture, financed by the rest of the community. Such help, however, is unlikely in most cases to make agriculturists permanently better off. In the long run, the lower standard of life of those who are taxed to help agriculture will react on farmers and farm workers by diminishing the opportunities for obtaining higher incomes in industry and so increasing the pressure of labour on the land. Thus any special assistance to agriculture will be unlikely, eventually, to help any one except landlords, who will profit by the increased demand for agricultural land. The short period, however, may be of considerable length, and farmers and workers may benefit for many years from intervention on their behalf. And the owner occupier may, of course, gain for a very long time.

§ 7. *The Protection of Farm Wages.* Except in the very long run, moreover, it makes a considerable difference whether assistance is given, in the first place, to farm workers or to farmers. When farmers are first helped competition between them will, generally, ultimately bid up their employees' wages; yet, even when competition is effective, which is by no means always so, this reaction will take some time to complete. Moreover, if farmers' incomes are raised by measures which restrict output, farmers will have no incentive to offer higher wages, since they will require fewer, not more, workers. Partly for this reason, partly because agricultural wages are often so low compared with industrial, the State has sometimes stepped in to raise farm wages. Its intervention frequently takes the form, as it does in England, of the legal enforcement of a minimum wage.

Since wages are low in agriculture mainly because employment is declining there relatively to industry, it might be expected, at first sight, that to raise the level of wages would often aggravate the situation. Farmers, unless they were also assisted, would be likely to demand fewer men at the higher wage, while the movement of workers out of agriculture would be partially checked, and unemployment would result.

In fact, the minimum wage regulations in England have not had this effect, and unemployment has been far lower in farming than in most other industries. For this there are two main reasons. First, it would seem that farmers have tended to try to pay a traditional wage only vaguely related to the value to them of their workers. The farm labourers, scattered as they are over the countryside, have never succeeded

in organizing into Trade Unions which could give them equal bargaining power with their employers. Thus, to a certain extent, the compulsory Wages Boards have only raised low wages to their economic level.

Secondly, the establishment of minimum wages has forced the most inefficient farmers either to go out of business or to reorganize their methods and, in particular, to mechanize their farms and to adopt such labour-saving devices as had already been introduced by the more adaptable farmers. Thus farming methods have in some places been improved more rapidly because of the introduction of minimum wages, and farmers have been able to pay the higher wages asked.

The importance of these adaptations is shown by the fact that, in spite of agricultural depression, farm wages after the first world war, when minima were fixed by the Agricultural Wages Boards, rose far more compared with pre-war than industrial wages, and represented about half as much again in real terms as before the war.

Most of the methods used to assist agriculture have, however, been intended in the first place to help farmers. They have taken three chief forms :

- (1) direct subsidies from the Exchequer ;
- (2) the restriction of imports of agricultural products ; and
- (3) the restriction of total supplies, in order to raise prices ; such a policy may either be undertaken by one country alone, or by agreement between a number of countries or, exceptionally for agriculture, between producers in a number of countries.

Some of these methods are better designed than others to achieve the objectives of agricultural protection, at the minimum cost to the community. As we shall see, too many of the devices actually adopted are purely haphazard measures aimed at raising farmers' incomes, and incapable of achieving all, or sometimes any, of these objectives.

§ 8. *Subsidies to Agriculture.* We have already referred several times to the use of direct payments from the Exchequer as a means of increasing farmers' returns. Such subsidies can be used for a number of purposes. Thus they can be intended to mitigate the effects of the trade cycle, by increasing the incomes of all farmers in times of depression; this was the idea behind the payments made under the Agricultural Adjustment Act in the United States after 1933. They can be designed to break the vicious cycle of prices and output for individual commodities such as pigs, by increasing producers' incomes when they are low. They can assist the development of types of agriculture or methods of production deemed desirable for reasons of defence. Thus the heavy subsidies on sugar and wheat in Great Britain before the recent war were intended to increase the output of these products, partly in order to decrease the country's dependence on foreign supplies in case of war. Again, the subsidies paid in Great Britain on the ploughing up and re-seeding of old grassland, and on applications of lime and slag, were designed to encourage methods of farming which it was believed the farmer undervalued but which would increase the productivity of the soil. They can be used to prevent or even reverse the exodus

of workers from the land, if they are paid over a long period on all farm products. Finally, they can be designed to stimulate the type of consumption the State wishes to increase, by all consumers or by a specified class. The farmer, also, benefits from such a subsidy by an increased demand for his product from those who obtain it more cheaply than before. This is the basis of the pre-war subsidy paid in Great Britain for supplying milk to school children at about half-price, and for the much larger present scheme for cheap or free milk for children and expectant and nursing mothers.

Of course subsidies may also be used for less legitimate purposes, such as to raise the incomes of farmers producing products whose prices have fallen because of a lower demand for them or because of permanently reduced costs. Such subsidies will hamper the desirable readjustment in production. There is little doubt, in fact, that the wheat subsidy in Great Britain before the war fell more into this category than into that of a defence measure.

We have already seen that a general subsidy will probably scarcely affect output in the short period ; but, if it is permanent, it is bound ultimately to attract resources into agriculture or prevent them from moving out. A subsidy on only a few products will certainly rapidly increase their output at the expense of that of other competing farm products. If it is not intended to have this result but only to raise the incomes of those who produce the subsidized product, then it must be limited to a specified quantity of output. Farmers may be offered an enhanced price, but only for an output equal or proportional to what each

farmer was selling at some given moment in the past. They will then not be encouraged to produce more than this, since they will receive no higher price than they did before for any increase in output. The only advantage of such a subsidy is to make existing farmers better off. New producers will not benefit, and existing farmers will be able to continue in business with little competition from new people who would like to increase their output and develop better methods of production.

The effect of subsidies is different according to the objects on which they are assessed. If it is desired to increase production the best method is a payment proportional to output ; but, as we have already seen, this involves at least a record of sales. Where this is impracticable or undesirable a subsidy may be assessed on acreage of crops or numbers of livestock. Such a method favours extensive as against intensive production and thus tends to encourage less efficient forms of production ; thus the acreage subsidy on wheat and potatoes during the war certainly induced some farmers to plant these crops on unsuitable land and then to neglect them ; for they still received the subsidy. Subsidies may also be paid per ton of agricultural requisites used. If it is desired to encourage the use of the subsidized product this is desirable. But sometimes this is not so ; thus purchased feedingstuffs were subsidized during the war at a time when it was necessary that farmers should economize in their use. The purpose was to prevent demands for higher prices ; but the result can hardly have been said to be entirely successful.

The advantage of a subsidy as a method of assisting

farmers is that its chief burden falls on the taxpayer, who should be the person most easily able to bear it. If there are only a few farmers in a country compared with the industrial population, then it is easier to assist them; for the burden on each taxpayer will be relatively small. This is the position in England, where the persons employed in agriculture are only about 7 per cent of the total employed population, and where agricultural income is a smaller percentage of the whole national income.

If a country produces mainly agricultural products, taxes to help farmers must largely be paid by farmers, so that any substantial assistance to agriculture as a whole can only be obtained if it is possible to extract contributions from foreigners.

§ 9. *Restriction of Imports.* A second method of assisting farmers is to reduce the quantity of agricultural products imported, with the intention of raising the demand for farm products grown at home and helping the home farmer at the expense of the foreign. This method has been used, to a greater or lesser extent, by all countries which import a substantial quantity of agricultural products, but is impracticable for other countries. Sometimes imports are checked by a tariff, sometimes by direct limitation of the amount which may be imported through imposing a quota or licensing imports, sometimes by exchange restrictions. The case for and against tariffs has been discussed in a previous volume of this series,¹ and cannot be repeated here. We must, however, note

¹ R. F. Harrod, *International Economics*, Ch. IX.

the salient differences between subsidies and import restriction as methods of assisting farmers.

The method of import restriction depends, for its efficacy, on raising the price of the home-grown produce, but there are circumstances where this cannot be done by means of a tariff. If foreign supply is highly inelastic, the same amount of product will be sent, so that prices do not rise at all in the importing country. The supply of industrial products is generally fairly elastic in normal times, but, as we have seen, the supply from family farms is generally inelastic even for a fairly long period.¹ Great Britain draws a large part of her imports of agricultural products from countries with family farms ; moreover, many of these countries had few alternative markets before the war to which they could send, so that their supply to the British market was very inelastic in the short run. It follows that a tariff was particularly unlikely to help British farmers. On the other hand, Great Britain was then in a position to raise a considerable revenue from tariffs at the expense, in the short run, of the foreigner, who, if he sent the same quantity as before, would pay the whole of the tax ; this revenue could be used to subsidize British agriculture.

If supply is elastic, as it sometimes is, or if imports are cut down by quota to a fixed amount, then the prices of the imported product will rise. Thus its burden falls on the consumer of foodstuffs, not, as it does with an Exchequer subsidy, on the taxpayer. In other words, since the poor do not buy so very much less food than the rich, and since the general

¹ See pp. 104-115.

system of taxation is usually designed to obtain considerably more from the rich than from the poor, import restriction bears more heavily on the poor than does a subsidy. This would be true even if home production and imports were exactly similar and the consumer indifferent between them ; but, in fact, this is not so, and the two types of product serve markets which are partly distinct.¹ It follows that a restriction of imports normally increases the price of the imported variety far more than of the home variety, so that the consumer of the imported product loses more than the home producer of the protected product gains. As imports were generally, before the war, cheaper than home products, and were consumed particularly by the poorest people, a restriction of imports thus actually bore more heavily on the poor than on the rich, and was therefore particularly undesirable.

There are many examples of this effect of import restriction. One of the most striking is provided by the effect on bacon prices in the United Kingdom of the quotas on imports first imposed at the end of 1932. Between 1932 and 1936 bacon imports were reduced by 42 per cent ; the retail price of Danish streaky bacon rose from 9½d. to 1s. 4d. per lb., but of British Wiltshire bacon only from 1s. 3d. to 1s. 5½d. per lb., while the price the British farmer received for a first quality baconer increased only from 10s. 4d. to 11s. 5d. per score, or by 5 per cent.

It is, moreover, doubtful whether import restriction can in normal times benefit farmers as a whole in a country such as Great Britain, even in the short period.

¹ See p. 120.

The reduction in the real incomes of the working classes caused by the higher prices of imported foods leads to a lower demand for other foods, particularly for the more expensive types, the home-grown varieties and the protective foods, which were mostly grown by British farmers. It follows that a policy of import restriction, though it benefited those farmers whose products were mostly highly competitive with imports, probably damaged those who produced the more highly priced products.

Thus, while import restriction will certainly make a country less dependent on imports in time of war, it is doubtful whether it can attain any of the other objectives for protecting agriculture which seem desirable in normal times. However, import restriction may be imperative in times like the present.

§ 10. *The Restriction of Total Supplies.* The third method of protecting farmers differs from the first two in that it involves a restriction of the sales made by those who are concerned in order to improve their returns. Such a policy may be international, the Governments of a number of countries or their producers agreeing to limit sales so as to raise prices, or not to sell below a certain price, thus indirectly limiting sales to what consumers will buy at such a price. Or it may be confined to one country and aim at raising farmers' returns by altering the supply of home-produced products, not, as does import restriction, the demand for them.

Such a policy therefore involves some compulsory powers, either directly over the price which may be charged by home producers, or indirectly over price

by direct control over the amount which they may sell. Two forms of supply restriction must be distinguished. Either the total supply which may be sold, at all or in the most profitable market, may be controlled, but individual farmers may be left free to produce as much as they like, or the amount which each individual produces may be regulated.

If sales alone and not production are limited, it is necessary to devise some way of dividing the receipts from the restricted sales among producers. Two main methods exist. Either every producer may be permitted to sell only a specified proportion of his output on the most profitable market, as was provided for under the Potato Marketing Scheme in Great Britain, or all payments made for any product may be pooled by a central organization, and divided among producers proportionately to the quantity that each supplies. This is the principle of the Milk Marketing Scheme in England.

Such a policy of limiting sales, either directly or through the control of price, will benefit producers only if the demand for their products by merchants is inelastic. If the amount segregated from the main market must be wasted, then the elasticity of demand must be less than unity if farmers are to gain. If it can be sold, though at a lower price, then demand can be less inelastic and producers still profit from restricting sales on the main market; thus, if the amount removed from the principal market can be sold elsewhere at half the original price ruling in the chief market, producers will benefit from restricting supplies provided merchants' demand is less elastic than 2.

If supply control is confined to one country, the demand for the home product will only be inelastic if any increase in price does not stimulate larger imports ; this can generally only be achieved either if transport costs are high or if imports are restricted artificially by tariffs or quotas. In England this method of control was before the war applied to hops, potatoes and liquid milk, all products with an inelastic demand ; for liquid milk transport costs provided efficient protection ; for potatoes and hops imports were limited by quotas and tariffs. If control is international, as it was then for sugar, then supplies from all sources will be cut down and only the total elasticity of demand is relevant.

This policy, like that of import restriction, puts the burden of assisting the farmer on the consumer, not on the taxpayer. Unlike a subsidy, also, it can be applied effectively only to those products which have a relatively inelastic demand. It involves waste, since the proportion of the product which is removed from the main market must be either destroyed or diverted to uses in which consumers are only prepared to pay a lower price, and which, consequently, must represent less satisfaction to them. This proportion will increase as supply responds to the higher return, and the average return to the farmer will fall, thus leading to a demand for still higher prices, in order to bring average returns up again.

The absurdity of this situation needs no stressing ; why attract more resources into an occupation where some of the existing resources are either wasted, or devoted to products for which the consumer is prepared to pay less than they cost ? Since the mechanism

for raising prices is to limit *supplies* on the market, it seems ludicrous that *output* should be allowed to increase. This is the justification for restricting production as well as sales ; the enhanced price may be confined to a fixed amount of production, just as a subsidy can be. This, in effect, is what happened under the Hops Marketing Scheme in England, where each producer was given a quota and received only a negligible price for sales in excess of this. Or the producer can be fined for increasing output beyond a fixed amount, as was the British potato grower.

If supply restriction is permitted it therefore seems logical to permit also production control. But there are two serious disadvantages to doing so. First, the chief restraining influence on those controlling the monopoly disappears. A monopoly cannot increase prices indefinitely if, as a result, output increases. If the monopoly is given powers to prevent output from increasing it is far freer to fix prices high. Secondly, individual quotas are almost inevitably fixed in the light of past performance ; hence they hamper the expansion of the efficient while securing higher profits to those already in the industry.

So far we have discussed supply and price control on the assumption that the whole product is sold within the area where the scheme operates. If some of it is exported there are two possible forms of price control, almost diametrically opposed. First, home supplies may be limited, prices raised and the surplus exported at any price it will fetch, instead of being wasted or used for low-priced products at home. Such a policy can only be effective if a tariff prevents the exported goods being reshipped to the producing country. If a

pooling system is followed the exportable surplus may simply be sold abroad at the prevailing price there, while prices at home are maintained at a higher level. A similar result is attained if a subsidy is paid on exports. Then merchants will prefer to sell abroad so long as the price obtained for such sales falls short of the domestic price by less than the export subsidy, supplies will be diverted from the home market and prices there will rise. Whichever system is followed, the larger volume of exports will depress the price abroad by a considerable amount if demand is inelastic. Moreover, foreign countries may object to receiving "dumped" imports since, although they gain by cheap goods, it is probable that the dumping will be temporary; thus their producers will suffer and may go out of business, thus making supplies short subsequently.

Alternatively, when the bulk of the product is sold abroad, the exporting country, instead of giving foreigners a present of cheap goods, may monopolistically increase the prices they charge, by restricting supplies. If the Malayan rubber growers, or the Brazil coffee planters, or the New Zealand dairy farmers, reduce their sales, the main sufferers will be consumers in other countries. If the demand for their products is sufficiently inelastic, the exporting country as a whole may gain. But for this to be so it is necessary not only that the demand for the product concerned should be inelastic, but also that there should exist no other sources of supply whose producers can expand output at the expense of the country which is endeavouring to raise prices. Fortunately for consuming countries the latter condition

is not often fulfilled ; it is rare indeed for any producing country to have such a monopoly of soil or climate that competitors would not appear if prices were considerably increased.

The monopolistic increase of prices is almost always to be deplored, except, if we take a narrow nationalistic point of view, when a country can raise its prices against foreigners. When undesirable fluctuations in income follow price variations it is better to correct them by subsidies than by raising the average price to consumers. If prices can be made more stable by a real reduction in the costs or risks of storage this objection does not apply ; if, however, the product cannot be stored, then any control of output in years of bumper crops will merely mean that parts of these crops are wasted, without any corresponding increase in the short crops. Nevertheless, if subsidies are politically impracticable, there may be occasions when price control is temporarily desirable in order to prevent a serious fall in farm incomes, or to avoid serious fluctuations in the prices and subsequent output of individual products. It is unlikely, however, that any producers' body which is given such powers will confine its price-raising activities to these required ends ; almost always such bodies endeavour to increase producers' incomes at the expense of the community. That is no doubt the reason why the new international proposals designed to prevent extreme price falls for primary products are to be entrusted to Governments rather than to producers.

§ 11. *The Planning of Agriculture Prices.* In the preceding sections we have examined what protection of

agriculture may be desirable in normal times. When prices cannot be allowed to equate demand and supply, far more drastic intervention is required. Some of this we have already mentioned in earlier sections when we discussed intervention in production and marketing and measures to direct resources to the places they are most required and to stabilize prices. In particular we pointed out that the State is then faced with the task of so fixing the prices farmers receive as to encourage the production of those food-stuffs most required.¹ Nor is this all. If prices are controlled below the levels consumers would be prepared to pay out of their inflated incomes and supplies are rationed, farmers in general must receive enough to cover their reasonable costs of production for their main products. Otherwise they will be induced to withhold their products from the official channels of distribution and sell them in the black market ; this has happened in a number of continental countries. Further, the State must try so to fix agricultural prices in general as to secure the right inducement as between the production of foodstuffs, which displace imports, and, for instance, the production of manufactured goods which can be exported to pay for imports.

Prices should be such as to attract into or keep in farming resources which cannot more profitably be employed in producing exports to pay for imported foods. It is beyond the scope of this book to examine the principles on which this complicated process must be based. The price at which the marginal requirements of food imports are likely to be available in

¹ See p. 177.

future is the most important factor which must be taken into account. But not necessarily the existing price in overseas currency converted into home prices at existing rates of exchange. For overseas prices may be expected to fall as additional supplies become available.¹ And existing rates of exchange may ultimately need adjustment to help bring our foreign balance into equilibrium. A further factor is expected costs; if some items, such as feeding stuffs and fertilizers, are subsidized, this also must be taken into account.

Thus the fact that farmers' prices do not correspond with the existing prices of imports does not necessarily mean that farmers are undesirably protected. But the fact that the prices fixed for some home-produced farm products are much greater compared with imported prices than for others seems to indicate, though it does not prove, that relative prices are not at present correctly fixed. Too much attention is almost certainly paid to the level of relative prices and costs that prevailed pre-war and too little to existing requirements under greatly changed conditions.

The fact that farmers receive for foods a good deal more than consumers pay does not, of course, under present circumstances, indicate that farm prices are too high. For the consumption of foodstuffs is very heavily subsidized and consumption kept down by rationing. Consumers would be prepared to pay much more for their foods relatively to other goods than they do rather than buy less. These subsidies are granted largely to stop inflation by keeping down retail prices and hence moderating demands for wage

¹ See p. 166.

increases. In addition it is hoped to assist the poorer consumers.

These are complicated questions into which we cannot further enter here.

§ 12. *Difficulties of Planning in Agriculture.* We began this chapter by outlining the special justifications for State interference in agriculture; we can best conclude it by pointing out some of its special difficulties. Any plan, to be really effective, must go right back to the amount produced; in agriculture, however, it is very difficult to control the farmers' actions. The farm is a very small unit, and the persons responsible for agricultural output are numerous and scattered, and apt to be individualistic in outlook and ignorant of modern developments. The English and American reader is liable to forget that agriculturists include not only the educated farmers with whom he comes in contact, but also the peasants of India, China or Eastern Europe. Since there is a world market for many foodstuffs, though at present a very imperfect one, the actions of these peasants react on the farmers in the more developed countries. The farm, moreover, is a home as well as a business, and many farmers regard their land not only as a factor of production but as something almost sacred, to be tended for itself as much as for its products.

The ignorance of farmers is not, moreover, the only reason why the results of interference in farming are less calculable than for other industries. The inter-relationships, both on the supply and the demand side, between the different agricultural products necessitate a detailed knowledge of the industry which no

planner in fact possesses. Finally, the weather is such an important factor in itself that the best plans may be upset by droughts or floods or diseases. For all these reasons it is very difficult to devise successful, large-scale plans in agriculture.

It is not, however, quite so difficult as the failure of many pre-war plans would seem to show. Many of these breakdowns should have been foreseen by those responsible for them. The muddles by which surpluses mounted up in exporting countries and by which, for instance, heavily subsidized sugar-beet industries were developed in Europe while the more productive sugarcane was abandoned in the West Indies, could easily have been avoided on the basis of existing economic and statistical knowledge. Too many plans—if plans they should be called—were based on sectional interests and short-run considerations only, and thus inevitably courted disaster.

This is probably to a certain extent still true. Many countries now attempt to plan to varying degrees their agricultural output. But these plans also frequently pay too little attention to consumers' requirements for food and too much to farm incomes with the existing structure of farming. It is impossible to ignore farmers' interests ; but, in the ultimate interests both of farmers and consumers, the requirements for food should dominate planning.

We must beware, none the less, of letting failures in the past prejudice us too deeply against any planning in agriculture. As we saw at the beginning of this chapter, there are many ways in which agricultural planning can, and has, helped the community even in normal times. No completely unplanned economy,

for instance, could have adapted Danish agriculture so rapidly to the changing conditions at the end of the nineteenth century. In circumstances like the present, with rapid changes, great shortages, and a tendency to inflation necessitating controlled prices and controlled supplies, a considerable measure of planning is indispensable. We may conclude by stating that planning in agriculture, as in industry, may often be desirable and sometimes essential, provided it is designed and carried into effect in the interest of the community as a whole.

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